MULTISAR: The Milk River Basin Project

A Multi-Species Conservation Strategy For Species at Risk:

Year 2-Progress Report

Alberta Species at Risk Report No. 87

Fish & Wildlife Division

RESOURCE DATA AND SPECIES AT RISK SECTION

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

Alberta Conservation Association
Conservation Through Collaboration

MULTISAR: The Milk River Basin Project

A Multi-Species Conservation Strategy For Species at Risk:

Year 2-Progress Report

Richard W. Quinlan, Brad A. Downey, Brandy L. Downey and Paul F. Jones (eds.)

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Richard Quinlan (Alberta Fish and Wildlife Division - AFWD) and Paul Jones (Alberta Conservation Association - ACA) developed, coordinated, supervised and administered MULTISAR: the Milk River Basin Project. Throughout the project Brad Downey (ACA) Brad Taylor (ACA), and Brandy Downey (AFWD) provided valuable contributions, particularly with respect to field logistics. Joel Nicholson (AFWD) provided direction for the reptile inventories and supervised field activities for part of the 2002 field season.

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MULTISAR: the Milk River Basin Project is a collaborative effort of three agencies and many other participants. It is succeeding because of the co-operative teamwork of all partners. This demonstrates a special open - minded attitude that goes beyond commitment and pride in any one organization, and is indicative of a desire in our society for multi-species and landscape-level conservation.

Executive Summary

MULTISAR: The Milk River Basin Project outlines a process to provide appropriate management on critical parts of the landscape to achieve multi-species conservation. In the first year of study a summary of existing information on species at risk, identification of data gaps, fish and wildlife inventories from within the project area, and a species selection process were completed (*A Multi-Species Conservation Strategy For Species at Risk in the Milk River Basin: Year 1-Progress Report*). In year two wildlife inventories were continued, Habitat Suitability Index (HSI) models and Beneficial Management Plans (BMP's) were competed. Included in the year two-progress report are the results of wildlife inventories from within the project area, definition of the Multi-species Conservation Value (MCV) and an explanation of stewardships initiatives for year 3. The 17 HSI models and the BMP's developed for the project are included in two separate reports (*MULTISAR: The Milk River Basin Habitat Suitability Models for Selected Wildlife Management Species*, and *Beneficial Management Practices for the Milk River Basin, Alberta: A component of the Multi-Species Conservation Strategy for Species At Risk in the Milk River Basin (MULTISAR)*).

The project began as a concept within Alberta's Habitat Stewardship Program committee, and was subsequently designed by Alberta Fish and Wildlife and Alberta Conservation Association biologists. It has been delivered through a concerted effort involving permanent and project staff of Alberta Conservation Association and Alberta Fish and Wildlife Division, plus private biologists in the disciplines of wildlife, fishery, and range science.

The development of the MCV and BMP's has paved the path for the next step in this process. Stewardship programs will be initiated in 61,280 acres selected by the MCV during 2004. Landowners with critical habitat will be approached for the initiation of stewardship programs in 2005. Wildlife surveys will still be continued throughout the basin however attention will be focused on the areas identified as species at risk "Hot Spots" and wildlife monitoring programs will be established on steward's lands.

CHAPTER 1

INTRODUCTION TO MULTISAR THE MILK RIVER BASIN PROJECT

Introduction

Richard W. Quinlan, Alberta Sustainable Resource Development, Fish and Wildlife Division, Lethbridge, AB

MULTISAR: The Milk River Basin Project provides a practical system for the conservation and stewardship of multiple species at risk on a landscape level. The preliminary MULTISAR phase, completed in 2002, included a summary of existing data, surveys for species for which data was lacking, species selection, and development of preliminary habitat models (Quinlan et. al. 2003). Accomplishments during the 2003 project year included peer review and finalization of habitat models, development and implementation of a multi-species conservation value (MCV) process, continuation of inventories for species at risk, compilation of beneficial management practices for selected species, and development of a stewardship program. This report includes a project overview, results of the species at risk inventories, the MCV system, and describes the stewardship process. There are separate reports for the final habitat models (Downey et al. 2004) and beneficial management practices (RCS 2004).

The rationale for initiating the original "Milk River Basin" project is described in the year 1 report introduction (Quinlan 2003). In summary, the project stemmed from the need for a process to conserve multiple species at risk at the landscape level that complemented the traditional single-species approaches. The Milk River Basin, while it is Alberta's smallest major river basin, has the highest number of species at risk of any Alberta river basin. This led to selection of this landscape for development of Alberta's first multi-species process for species at risk.

During 2003 the project name was changed to MULTISAR: The Milk River Basin Project. The term "MULTISAR" incorporates the principle of multiple conservation organizations working together to conserve multiple species at risk (SAR). The MULTISAR name portrays the collaborative nature of the project.
MULTISAR: The Milk River Basin Project will be broadened to incorporate the implementation phase of some aspects of the Milk River site conservation plan of the Nature Conservancy of Canada's (NCC) Northern Mixed Grass Multi-site Conservation Initiative (Green et al. 2004). While some details are yet to be finalized, as the final site plan nears completion it is anticipated that many of the "conservation targets" identified by the committee will be incorporated into the MULTISAR process. These conservation targets are generally based upon geographic criteria (eg: riparian, sandstone outcrops), with "nested" wildlife species identified for each. Collaboration between NCC and MULTISAR provides additional opportunities for stewardship, which has become the primary emphasis for the MULTISAR 2004 project year. Also, exploration of areas for potential cooperation between MULTISAR and Operation Grassland Community (OGC) began in 2003. This led OGC mailing MULTISAR brochures to their cooperating landowners. Additional conservation partnerships are being pursued. MULTISAR invites, and is actively seeking, funding partners from the agricultural and petroleum industries.

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Study Area: The Milk River Basin

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and
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1.0 STUDY AREA

1.1 General

The study area was limited to the Milk River Basin (Figure 1.1.1) in southern Alberta, Canada. It is approximately 6,776 km^2 in size and the boundaries extend north from the United States border along the Saskatchewan border to Cypress Hills Provincial Park and west from the Saskatchewan border to Whiskey Gap. During the second year of study the project boundaries were extended northwest to incorporate the entire area of the Milk River Ridge.

Figure 1.1.1 Milk River Basin Study Area

1.2 Milk River

The Milk River Basin is unique to Alberta, in that it is part of the Mississippi Watershed flowing into the Gulf of Mexico. Within Alberta, it is made up of the North Milk and Milk rivers. The two forks join approximately 20 km west of the town of Milk River. The North Milk River is approximately 90 km in length, while the Milk River is approximately 271 km long (Clayton and Ash 1980). Some of the main tributaries to the Milk River include: Red Creek, Lodge Creek, Sage Creek, Shanks Creek, MacDonald Creek, Deer Creek, Bear Creek, Police Creek, Lonely Valley Creek, and Lost River.

1.3 Topography

Badlands, plains, uplands, and valleys are all components of the basin. Badlands are evident primarily in the downstream section near Lost River and are characterized by steep slopes and heavily eroded areas. Gently undulating plains primarily occur in the northwest corner of the basin south of Cypress Hills Provincial Park and in the west central portion of the drainage surrounding the town of Milk River. Upland habitat, characterized by rolling hills, occur in the south central portion of the drainage as an effect of the Sweet Grass Buttes in Montana and in the northeast corner along the Milk River Ridge. Valleys are limited to the area surrounding the Milk River and its tributaries. Many areas along the valleys contain eroded sandstone cliffs and hoodoos. This is particularly evident in the Writing-on-Stone Provincial Park area.

1.4 Vegetation

The Milk River Basin is located within the Grassland Natural Region and contains areas of the Dry Mixed Grass, Mixed Grass, Foothills Fescue and Northern Fescue subregions (Achuff 1994). The dry mixed grass ecoregion encompasses the largest area within the drainage and is represented by both short grass, such as blue grama *(Bouteloua gracilis)*, and mid-grasses like western wheat grass *(Agropyron smithii)*, June grass *(Koeleria macrantha)*, and spear grass *(Stipa spp.)*. The mixed grass ecoregion is only found in the northeast corner of the basin near the Cypress Hills and in the south central area north of the Sweet Grass Buttes. It contains similar vegetation as the dry mixed grass subregion however, more western porcupine grass *(Stipa curtiseta)* and northern wheat grass *(Agropyron dasystachyum)* are found in this ecoregion resulting from the slightly moister and cooler climate. The fescue ecoregion makes up a small percentage of the basin's total area. This ecoregion is found in the western part of the basin and is dominated by grasses such as rough fescue *(Festuca scabrella)*, Idaho fescue *(Festuca idahoensis)*, Parry's oatgrass *(Danthonia parryi)* and intermediate oatgrass *(Danthonia intermedia)*. Differences in vegetative communities are representative of differences in soils and climate (Achuff 1994).

Most of the shrubs and trees found in the study area are natural communities of thorny buffaloberry *(Shepherdia argentea)*, willow *(Salix spp.)*, and cottonwoods *(Populus spp.)* scattered along the riparian zones and valley draws in the basin. Silver sagebrush (*Artemesia cana*) is also prevalent throughout the basin and particularly extensive in the southeast corner of the basin. Other shrub species found in the basin include rose *(Rosa spp.)*, buckbrush *(Symphoricarpos occidentalis)*, saskatoon *(Amelanchier alnifolia)*, chokecherry *(Prunus virginiana)*, and skunkbrush *(Rhus trilobata)*.

Numerous forb species are present throughout the basin, two of which are of particular interest, western blue flag (*Iris missouriensis*) and soapweed (*Yucca glauca*). Both species are restricted to the Milk River Basin in southern Alberta.

Introduced species, such as common caragana *(Caragana arborescens)*, Manitoba maple (*Acer negundo*), Russian olive *(Elaeagnus angustifolia)*, and Siberian elm *(Ulmus rubra)* are found primarily in shelterbelts and hedgerow plantings within fields or around active or abandoned farmyards. Russian olive is becoming a concern in areas where it is found

in riparian zones. Other weedy species such as spotted knapweed (*Centaurea maculosa*) and yellow toadflax (*Linaria vulgaris*) are beginning to appear in the western portion of the basin (M. Uchikura, pers. comm).

1.5 Land Use

The study area is sparsely populated with only two towns, Milk River and Coutts, and the small community of Del Bonita located within its boundaries. The primary land use in the Milk River Basin is cattle grazing. Three large provincial grazing reserves (Pinhorn, Sage Creek, and Twin River), an Agriculture and Agri-food Canada research substation (Onefour), as well as numerous grazing leases preserve some of the natural grasslands. Only around 30 percent of the basin is cultivated and this activity is primarily centered around the town of Milk River. Oil and gas activity is present throughout the basin to a small degree, however, drilling activity appears to be on the increase. Several important ecological areas also occur within the study area including: Writing-on-Stone Provincial Park, portions of Cypress Hills Provincial Park, the Milk River Natural Area, and Kennedy Coulee Ecological Reserve.

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3.0 PERSONAL COMMUNICATIONS

Uchikura, M. Riparian Resource Technician, Alberta Riparian Habitat Management Program, Lethbridge, AB.

CHAPTER 2

BIRD INVENTORIES

Aerial Surveys of the Milk River Basin-2003

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1.0 INTRODUCTION

The objective of the Milk River 2003 Aerial Raptor Surveys was to survey all potential raptor-nesting habitats along the Milk River and associated coulees. The 2003 survey was designed as part of the MULTISAR project, and fell within one of the overall project objectives of identifying and prioritizing areas of the landscape of importance to species at risk. The complete length of the Milk River was surveyed for raptors in 2002 (Quinlan et al. 2003), but reduced funding in 2003 resulted in the downstream portion of the survey area be dropped, resulting in surveying of the same areas as was done in 2000 (Erickson 2000)

The Milk River Aerial Raptor Survey provided the opportunity to inventory all raptors and associated species along the Milk River within a short period of time. The 2003 survey required one day to be completed. During the spring of 2003 there were also ground surveys of previously established ferruginous hawk quadrats within the Milk River Basin (Downey 2004). These quadrats were established in 1982 and resurveyed in 1987, 1992, and 2000 (Stepnisky *et al.* 2002).

2.0 METHODS

Intensive surveys were conducted using a Bell 206 Jet Ranger helicopter along the Alberta portion of the mainstem of the Milk River downstream to the Deer Bridge (just downstream of Writing on Stone Provincial Park), plus associated coulees that contained suitable raptor habitat (cliffs, hoodoos, trees).

Cliffs suitable for nesting were thoroughly searched by flying the helicopter along the face of the cliff and watching for birds flushing from the cliff or for adults, young, eggs, or nests on the cliff. Observations of all birds of prey nests and individuals were recorded. Canada goose nests were recorded, however total numbers of geese not associated with nests were not recorded.

UTM location co-ordinates for observations were recorded on Garmin units. Specific co-ordinates are not displayed in this report, but rather stored in the Lethbridge wildlife database and Alberta's Biodiversity Species Observation Database (BSOD). Requests for specific locations should be made to the Alberta Fish and Wildlife Division Lethbridge Wildlife Biologist.

Two observers participated in the survey. The observers were situated in the left front seat and right rear seat of the helicopter. The front seat observer also navigated and recorded sightings.
Surveys were conducted from 0735-1637 hours on May 27. Conditions were clear and sunny with excellent visibility and winds around 35 km/hr. Temperatures ranged from 17°C at the start to 22°C at the end.

Fuel drums were hauled by truck to strategic locations along the survey route. This reduced the total flying time required for the survey.

3.0 RESULTS

A total of 6.8 hours of helicopter time was required to complete the Milk River aerial raptor survey. Thirty-nine active raptor nests (Table 1.1.1) were recorded compared to 42 in 2002 (Quinlan et al. 2003). This included nests of 14 ferruginous hawks, 13 prairie falcons, 3 golden eagles, 3 Swainson's hawks, 3 red-tailed hawks, and 3 great horned owls. Over seven times more raptor young were seen in 2003 compared to 2002 (Quinlan et al. 2003). There were also 22 Canada goose nests and 1 raven nest (Table 1.1.2). Approximate locations of active raptor nests are shown in Appendix A.

Table 1.1.1 Numbers of raptors observed on the Milk River 2003 aerial raptor survey

SPECIES	# ADULTS	# NESTS	# YOUNG	# EGGS
Ferruginous Hawk	19	14	11	13
Prairie Falcon	30	13	5	1
Golden Eagle	5	3	2	0
Red-tailed Hawk	10	3	0	0
Swainson's Hawk	7	3	0	6
American Kestrel	11	0	0	0
Northern Harrier	6	0	0	0
Rough-legged Hawk	1	0	0	0
Great Horned Owl	6	3	4	0
TOTAL	**95**	**39**	**22**	**20**

Table 1.1.2 Numbers of non-raptorial birds observed on the 2003 Milk River aerial raptor survey

SPECIES	# ADULTS	# NESTS	# YOUNG	# EGGS
Canada Goose	19	22	23	52
Crow	1	1	3	0
Grey Partridge	16	0	0	0
Long-billed Curlew	2	0	0	0
Raven	0	1	5	0
Ring-necked pheasants	4	0	0	0
Rock Doves	83	0	0	0
Sharp-tailed Grouse	10	0	0	0

Fifty-nine empty and inactive nests were observed in 2003, three of these were stick nest in trees and 56 were stick nests on the ground. Some of these nests may have been active, but were not occupied during the short period available for observation during the aerial survey. Some nests may have been abandoned during nesting, or may have been predated

upon earlier in the season. In 2002, 98 inactive nests were recorded in the larger survey area, 81of which were within the area surveyed in 2003

A total of 95 individual raptors were sighted on the 2003 survey (Table 1.1.1). The most numerous were prairie falcon (30), followed by ferruginous hawk (19), American kestrel (11), red-tailed hawk (10), Swainson's hawk (7), Northern Harrier (6), Great Horned Owl (6), Golden Eagle (5), and rough-legged hawk (1). Locations of raptor sightings are shown in Appendix B. Several non- raptorial birds were also observed including 83 rock doves, 19 Canada geese, 16 gray partridges, 10 sharp-tailed grouse, 4 ring-necked pheasants, 2 long-billed curlews, and 1 crow (Table 1.1.2).

4.0 DISCUSSION and RECOMMENDATIONS

The number of ferruginous hawk nests seen in 2003 was similar to that of the same portion of the 2002 survey. The 2002 survey had higher numbers of adult ferruginous hawks (summarize for same survey area) (Quinlan et al. 2003). However, the number of active nests in the survey area covered in all three surveys dropped from 23 in 2000 to just 15 and 14 in 2002 and 2003 respectively (Table 1.1.3). One probable cause of this reduction was the occurrence of two major snowstorms, with strong north winds, two weeks prior to the 2002 survey (Quinlan et al. 2003). Subsequently 2003 was a better year for ferruginous, which re-established ground nests in the North Milk River. Nest numbers were still low in 2003, possibly a result of poor production brought about by the extreme rain and snowfall events in spring 2002. Additional surveys should be conducted to determine how the ferruginous populations recover after drastic climatic events during breeding season.

Based upon the 2002 (Quinlan et al. 2003) and 2003 surveys it cannot be concluded whether the documented decrease of nesting ferruginous hawks is indicative of a continuing downward trend, or a short-term fluctuation resulting from severe weather events, or possibly other causes. Continued surveys, using the 2003 survey route, are recommended as an important part of the MULTISAR monitoring program

Table 1.1.3 Comparison between species observations for the 2000, 2002 and 2003 surveys

Species	# Adults 2000	# Adults 2002	# Adults 2003	# Nests 2000	# Nests 2002	# Nests 2003
Ferruginous Hawk	29	30	19	23	15	14
Prairie Falcon	32	27	30	19	15	13
Golden Eagle	1	10	5	1	2	3
Swainson's Hawk	3	19	7	2	3	3
Red-tailed Hawk	4	12	10	0	2	3
American Kestrel	6	15	11	0	0	0
Merlin	0	3	0	0	0	0
Long-billed Curlew	0	6	2	0	1	0
Canada Goose	N/A	10	19	0	12	22
Great Blue Heron	1	3	0	0	0	0

This survey demonstrated some differential use of the Milk River valley by raptors. All of the 2003 ferruginous hawk nests were located in the upper Milk River, including the

North Milk River. The majority of these nests were located on the ground, generally on cliff ledges and on the tops of hoodoos. Ferruginous hawk use of hoodoos was particularly common in the upstream portions of the North Milk River. This area warrants particular attention for ferruginous hawk conservation and stewardship activities.

The middle portion of the 2003 survey, Milk River town to Writing-on-Stone Provincial Park, continues to have the highest density of prairie falcons and prairie falcon nests. Most observations were in sandstone cliffs and hoodoos along the river and in Police Coulee. No peregrine falcon nests were observed, however, ground surveys in 2003 resulted in two peregrine falcon sightings in late May, with no nests located. The Milk River valley does provide suitable and historic habitat for peregrine falcon, and it is anticipated that, if current provincial population trends continue, the species will repopulate this area.

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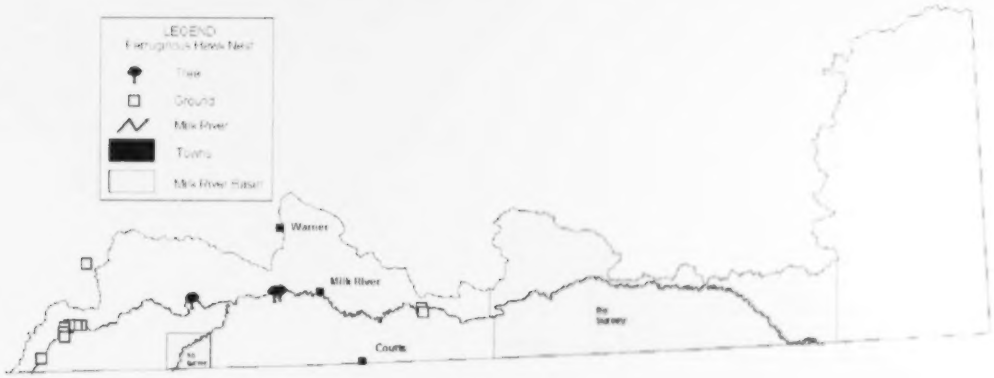
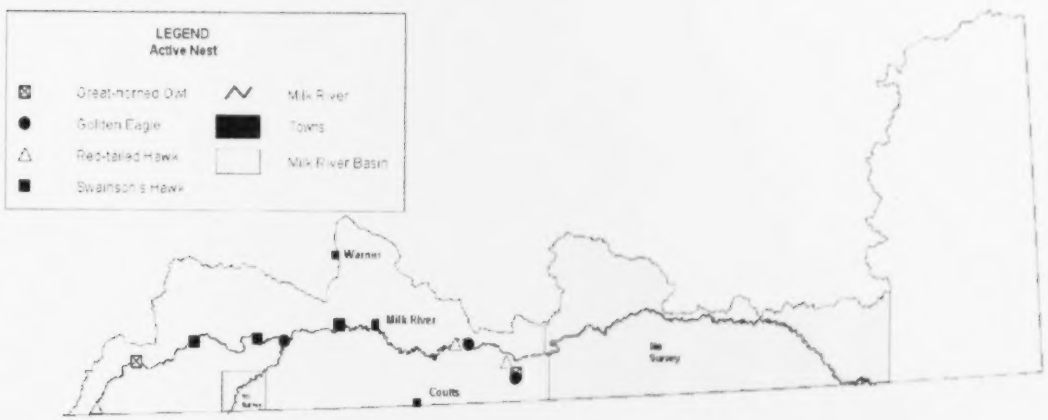
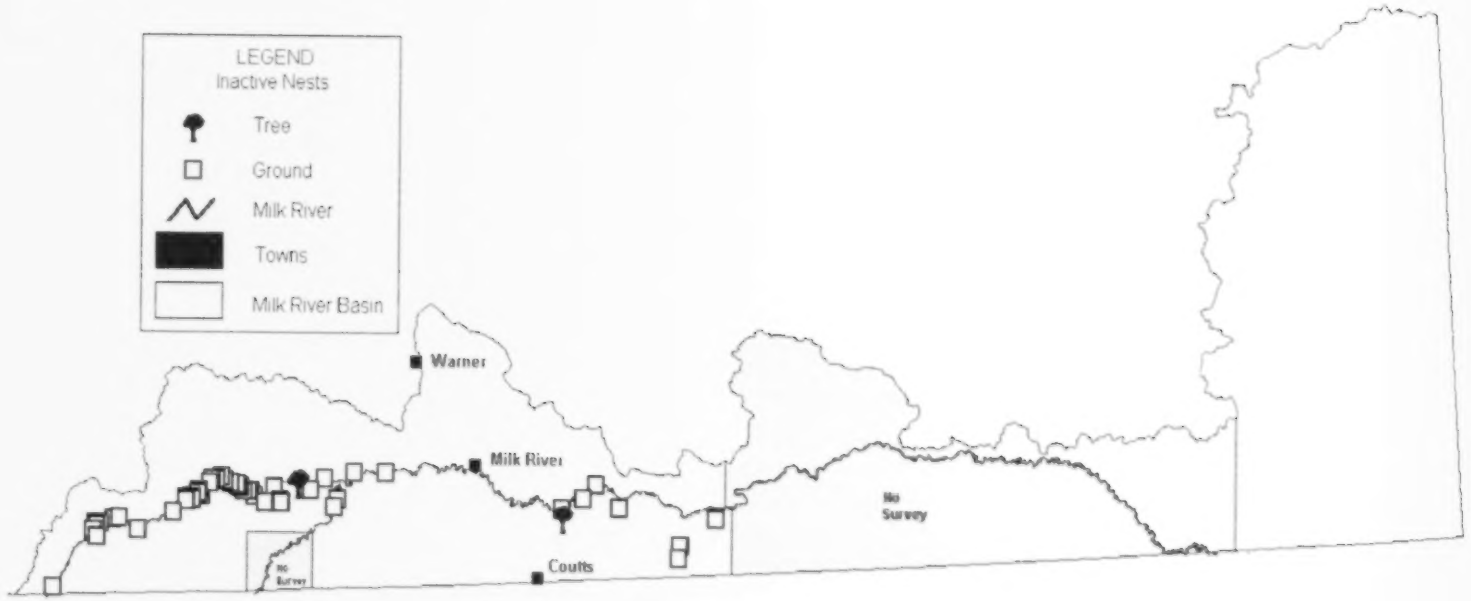
Appendix A- Active Raptor Nests 2003

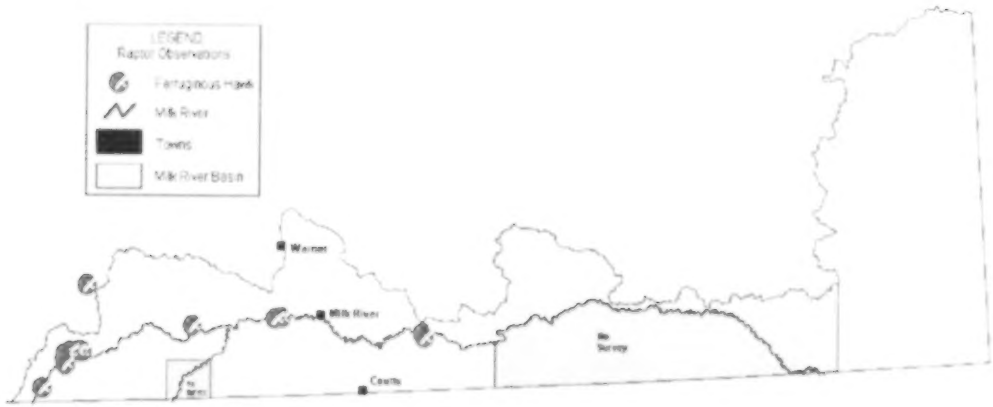


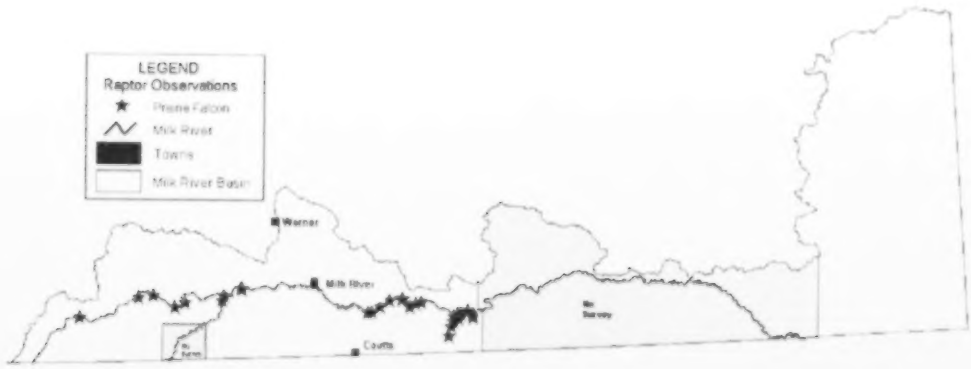


Inactive Raptor Nests 2003



Appendix B- Raptor Observations 2003





LEGEND
Raptor Observations
Great-horned Owl
Golden Eagle
Northern Harrier
Milk River
Towns
Milk River Basin
Warner
Milk River
Coutts

Burrowing Owl Surveys in The Milk River Basin

Brandy L. Downey, MULTISAR: The Milk River Basin Project, Lethbridge, AB

1.0 INTRODUCTION

The burrowing owl (*Athene cunicularia hypugaea*) was once widespread throughout the Canadian prairies, however due to changes in land management, habitat destruction and pesticides it has declined over its entire range (Wellicome 1997). The burrowing owl is currently considered "At Risk" in Alberta and is legislated in Alberta's Wildlife Act as "Threatened" (Alberta Sustainable Resource Development 2001). It is considered an "Endangered" species nationally (COSEWIC 2003). The large home range of the burrowing owls coupled with its rarity makes it a difficult species to survey. Little information exists about the burrowing owl with in the Milk River Basin (Wellicome 1997). In the mid-nineties an Alberta census of the species was carried out, which included areas within the Milk River Basin (Schmutz 1996). This survey was successful at locating several pairs within the basin, however due to its cost has not been repeated. A road transect survey was designed in 2001, to acquire current data about the burrowing owl in the Southeastern corner of Alberta (Nicholson and Skiftun 2002) The 2001 survey was plagued by unfavorable weather conditions, consequently only two pairs were found during the six week study. The value of continuing this survey was questioned due to the low number of burrowing owls detected (Nicholson and Skiftun 2002). In order to evaluate the merits of this method, the transects were repeated as part of the MULTISAR project in 2003.

2.0 METHODS

Several changes were made to the method based on the results of the 2001 survey and the limitations of the MULTISAR project. The first difference was the manpower available. In 2001, one technician was dedicated solely to the burrowing owl study and was available for 6 weeks of intense surveys (Nicholson and Skiftun 2002). In 2003, 2 members of the MULTISAR project staff conducted the surveys but were available for only 8 days. Secondly the number of routes was increased from 2 to 6 to represent the full area of the Milk River Basin (Figure 2.1.1). Two of the three original routes were renamed and repeated (Nicholson and Skiftun, 2002). The additional 4 routes added, routes 3-6, were designed to include historical burrowing owl records found on the Biodiversity/ Species Observation Database (BSOD).

The 2003 surveys were conducted from 06:00 until 13:00 hours, from June 10 to June 18. Weather measurements were taken at both the start and end of the survey using a wind/temperature gage; with additional measurements being taken if there were changes during the survey (Nicholson and Skiftun 2002). Persistent winds over 20 km/h, and steady rain was considered unsuitable for the survey (Scobie and Russell 2000).

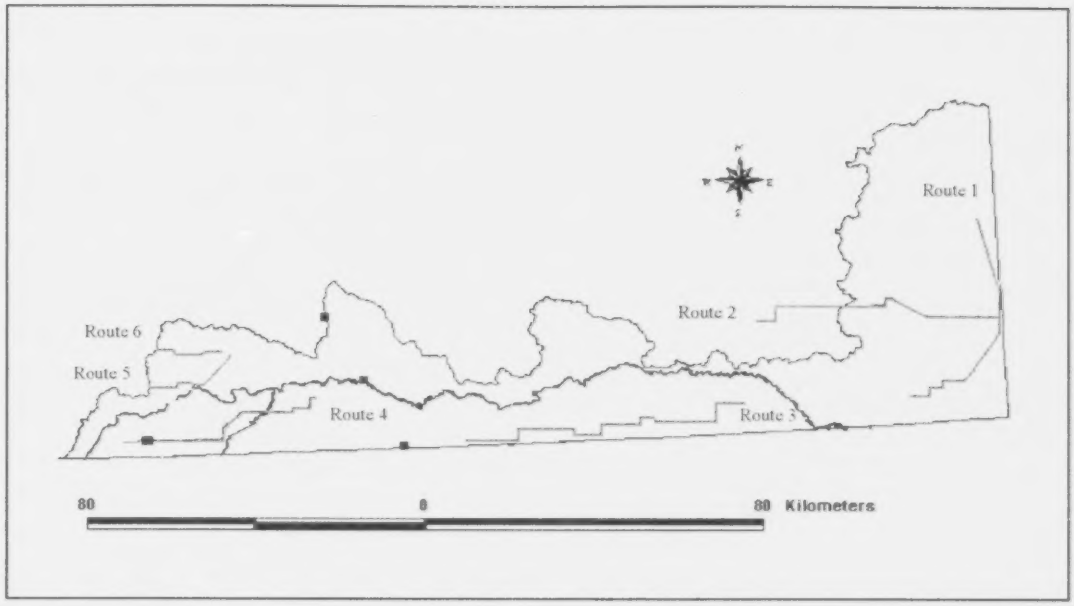


Figure 2.1.1 2003 Burrowing Owl Milk River Basin Route Map

Based on the 2001 survey protocol observation points were designed a kilometer apart and a 5-5-2 method of observation was utilized at each stop. In the 2001 survey a 5-5-5-3 method of observation was utilized however the time constraints of the 2003 survey required the observation period to be shortened. Therefore the final scan was shortened to 2 minutes from 5 and the 3 minute breeding bird survey was removed (Duxburey and Holroyd 2001). The observer scanned for 5 minutes, followed by 5 minutes of call playback and a two minute final scan. To cover the entire area of each stop, the call playback and scanning occurred in a 360-degree radius (Nicholson and Skiftun 2002). If a burrowing owl was detected the location was recorded using a GPS unit in NAD 83 UTM coordinates. The owls were observed and the number of birds, behavior, and burrow location was recorded (Appendix C). The site would be revisited periodically throughout the summer to determine its status.

3.0 RESULTS

There were no burrowing owls found during MULTISAR roadside surveys in 2003. Route 1 and Route 2 were repeated from the 2001 surveys, but as a result of their length and unfavorable weather conditions the surveys were not completed in their entirety. In addition to the burrowing owl roadside surveys; loggerhead shrike and long-billed curlew surveys were conducted along the same routes with no burrowing owls detected. Though there were no sightings of burrowing owls during the surveys with in the basin, one pair was found just north of the basin during a separate Alberta Conservation Association survey (Landry per comm.) Additionally a separate birding group located 5 burrowing owls within and just outside the basin (Parson 2003). Operation Grassland community also received reports of 2 pairs of owls within the MULTISAR study area from cooperating landowners in 2003 (Tomyn Per. Comm.)

4.0 DISCUSSION

The lack of burrowing owl detected along the 6 routes does not mean there are no burrowing owls within the study area. The incidental sightings of the species indicate that burrowing owls are sporadically distributed throughout the basin. The areas covered by the majority of the surveys were along well-used roadways, which may have biased the surveys and decreased the chance of detection. The MULTISAR Habitat Suitability Index model (HSI) states that habitat suitability for the species increases as the distance from roads increases (Skiftun 2004). Therefore the areas that are included in this study may not be the most suitable habitat for burrowing owls. This may explain the lack of detection in 2003, and the low numbers in 2001.

Roadside surveys were originally initiated because they could cover large areas thoroughly at a relatively low cost (Nicholson per comm.). However this is not true if time and manpower requirements are weighed against the end results of the survey. Other surveys attempted in the area include block surveys, which have been found to be successful at locating burrowing owls in other areas (Schmutz and Wood1991, Schmutz 1996, Scobie and Russell 2000, Duxbury and Holroyd 2001). However the essentially large size of the Milk River Basin combined with the high manpower costs and low detection rate makes block searches impractical (Duxbury and Holroyd 2001).

Based on the finding in both the 2001 and 2003 surveys combined with information from the literature; systematic surveys are not a reasonable method for monitoring burrowing owls in an area such as the Milk River Basin. However an inventory and monitoring method is required due to the current status of the burrowing owl. In order to work within the constraints of the study area, the behavior of the species and the goals of the project; monitoring should be limited to block surveys on participating MULTISAR steward's land and incidental sightings within the basin. This will monitor the species within the study area without the excessive manpower and financial cost of a basin wide survey.

In addition to the surveys on participating steward's land and incidental sightings, conservation groups who already have working relationships with landowners in the area should be consulted (OGC). Collaboration between the MULTISAR project and other conservation groups may allow for sharing of information, education of landowners and consolidation of conservation goals.

5.0 MANAGEMENT RECOMMENDATIONS

- Off road block surveys should be established in areas of critical habitat and on participating MULTISAR landowner's land.
- Continue monitoring incidental sightings of the burrowing owl with in the Milk River Basin.
- Communicate with conservation groups who are already working with landowners in the area to consolidate goals and objectives.

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7.0 PERSONAL COMMUNICATION

Julie Landry, Alberta Conservation Association, Southern Business Unit, Lethbridge, Alberta

Joel Nicholson, Alberta Sustainable Resource, Fish and Wildlife Division, Medicine Hat, Alberta

Lyndsay Tomyn, Operation Grassland Community, Alberta Fish and Game Association, Edmonton, Alberta.

Appendix C- Burrowing Owl Data Sheet

Survey Information

Name:_____ Affiliation:_____

Address:_____
Street address/Box#/City/Postal code

Phone Number: (____)_____ Email(optional):_____

Project Title:_____

Brief Project Description: (general discription of the nature of the work related to owls being conducted, if multiple nests only fill in once per project)

Nest Burrow Information (please fill in as accurately as possible)

Location (choose one)

Map Datum: Nad 27 Nad 83

UTM
Reference Merdian:_____ **Northing**:_____ **Easting**:_____

Historic Information:
Years Individual Burrow is Known to be Occupied.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ____

2003 2002 1999 1998 1997 1996 1995 1994 1993 1992 1991 1990 1989 1988 1987 Known since Year

Comments: (same or different owls, gaps in occupation, multiple nests, burrow abandonment (reason if know etc)

_____

_____

_____

Nest Description:

Location of nest: ☐ Natural ☐ Artificial ☐ Unknown
☐ Mammal holes Species:_____
☐ Other:_____

Average Diameter of Holes:_____

Approximate Number of Burrows* being used:_____

Minimum and Maximine distance of Satellite Burrows from Primary Burrow:_____min
_____max

Have you noted owls using Satellite Burrows as the nest burrows in subsequent years? Yes No

_____

_____

_____

_____

*- Satellite burrows would be defined as any burrow used for roosting, brood rearing, escape cover, food catching etc. that is in general vicinity of the nest burrow but itself is not the primary burrow.

Vegetation at Nest Site

Native Grassland Introduced Grassland Cropland Other_____

Percent Vegetative cover at immediate site (10 meters)

___% None ____% Grass(Native) ____%Grass(introduced)

___% Shrubs (species _____) ____% Cultivation

___% Trees (Species_____ _____)

___% Other _____

Percent Vegetative cover within 500 meter radius of nest burrow

___% None ____% Grass(Native) ____%Grass(introduced)

___% Shrubs (species _____) ____% Cultivation

___% Trees (Species_____)

___% Other _____

Slope: ☐ 0-15 degrees ☐ Gentle 16-30 degrees ☐ moderate 31-45 degrees ☐ Steep 46-60 degrees ☐ Very steep 61-90 degrees

Position on Slope: Bottom Middle Top N/A

Distance to nearest Wetland_____ meters **Type of Wetland_____**

Distance to Coulee_____ meters

Distance to Road_____ meters

Landuse Disturbance (record all disturbances of the nest if present)

Distance to 1st distubance____m Cropland Ranchland Oil and Gas Other____

Distance to 2nd distubance____m Cropland Ranchland Oil and Gas Other____

Distance to 3rd distubance____m Cropland Ranchland Oil and Gas Other____

Distance to 4th distubance____m Cropland Ranchland Oil and Gas Other____

Site Productivity Information

Is there evidence of successful breeding? Yes No

Observation Dates	Number of Young observe, comments etc

Other Notes (general habitat description, owl observation. Threats to site etc):

Milk River Basin Ferruginous Hawk Surveys-2003

Brandy L. Downey, MULTISAR: The Milk River Basin Project, Lethbridge, AB

1.0 INTRODUCTION

The ferruginous hawk (*Buteo regalis*) is declining throughout its range and is currently considered a Species "At Risk" in Alberta and a species of "Special Concern" in Canada (Alberta Sustainable Resource Development 2001, COSEWIC 2003). In 1982 Schmutz introduced a provincial quadrat monitoring program in Alberta. These quadrats were surveyed in 1987,1992, and 2000. Thirteen of these quadrats fell within or just outside the Milk River Basin. As part of the MULTISAR: The Milk River Basin project these thirteen established quadrats were used to monitor the ferruginous hawk in 2002 and 2003.

2.0 METHODS

The survey protocol is based on the method developed by Schmutz in 1982 and refined by Taylor in 2003. Eight of the original 150 quadrats developed by Schmutz are located within the Milk River Basin; 5 additional quadrats are found just north of the basin. All thirteen were surveyed.

The surveys began in the first week of May and continued to July 10. At the start of each survey, weather conditions, number of observers and start times was recorded. Surveys were not conducted during periods of rain or snow and when winds were above 6 on the Beaufort scale (Appendix D). Each quadrat was 4 miles by 4 miles in size, all roads within the quadrat were traveled and any raptor observed was recorded on the ferruginous hawk data sheet and plotted on the corresponding quadrat map (Appendix E). The location of the raptor was recorded using a Garmin GPS unit and recorded in Universal Transverse Mercator (UTM's) in Nad 83. Quadrat maps were also updated to reflect structural and land use changes since the last survey period.

If a ferruginous hawk nest was found, a nest habitat data sheet was completed (Appendix F). For each nest the type of nesting structure utilized, the height of the nest and the percentage of various habitat types within an 800 by 800 meter area of the nest was recorded. Binoculars and spotting scopes were used to reduce disturbances to nesting birds. If present, the number of young in each nest was recorded. Areas not visible from the road were further explored after gaining landowner permission. At the completion of the survey the end time, and weather conditions were recorded. Incidental nest sightings outside the quadrat surveys were also recorded in the Milk River Basin study area.

3.0 RESULTS

The quadrats in the Milk River Basin were completed in 1982, 1987, 1992 and 2000 as part of the provincial inventory program (Figure 2.3.1). These surveys were also conducted in 2002 and 2003 as part of MULTISAR. In 2002 slightly lower numbers of ferruginous hawks were detected during the surveys, with 2 nests and 4 adults found.

Surveys of the same quadrats in 2003 found a total of 8 adults and 4 nests; 18 additional nests were recorded as incidental sightings in 2003.

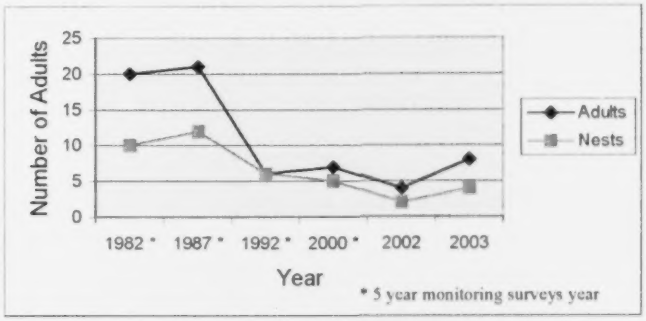

Figure 2.3.1 Number of ferruginous hawks located during quadrat surveys within the Milk River Basin.

The majority of ferruginous hawk nests were found in areas that had greater than 50% native graminoid coverage. Most other habitat features that were measured did not appear to have an impact on nest selection for the ferruginous hawk across the Milk River Basin, with the exception of wetlands. Over half the nests were found in wetland areas. This may be due to the dry climate, which limits trees to wetland areas.

4.0 DICUSSION

A comparison between survey years in the Milk River Basin shows annual fluctuations within the ferruginous hawk population. However, this is not a large enough sample to determine the statistical significance of any fluctuations at this time. In order to better understand these possible fluctuations the data should be compared to the new annual quadrat surveys of the complete grassland natural region (cite your other report) and the provincial inventories (Stepnisky 2002). It is recommended that initial statistical analysis should be preformed following the next provincial inventory, which should be conducted in the summer of 2005.

The nest site data collected, during both the quadrat surveys and random sightings, provided insight into the habitat associations and requirements for the ferruginous hawk. The ferruginous hawk tends to be found in areas of high native prairie components more often than in other primary habitat types. This is consistent with the results of previous surveys that found ferruginous hawk were positively correlated to native grassland habitat (Schmutz 1982, Stepnisky et al. 2002). There are several possible explanations for this positive relationship, such as prey availability, lack of competition, nesting structure availability and frequency of human disturbance. Habitat data should be collected for all hawk nests and combined with the results from the Richardson's ground squirrel surveys (Downey 2004) to determine the overall impacts of these factors on ferruginous nest selection

5.0 RECOMMENDATION AND MANAGEMENT OBJECTIVES

- Continue yearly monitoring quadrats for the Milk River Basin until next ferruginous hawk provincial monitoring program (2005).
- Record nest habitat of all hawks found on quadrats for habitat comparisons between species.
- Initiate stewardship programs in key areas for the ferruginous hawk. These programs should focus on the maintaince of native prairie habitat, prey base and nesting structures.

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Appendix D Beaufort Wind Scale

Beaufort Wind Scale

Force	Wind Speed			WMO Description	Wind Speed Indicators	
	MPH	Knots	KPH		At Sea	On Land
0	<1	<1	<1	Calm	Smooth as glass	Calm; smoke rises vertically
1	1-3	1-3	1-5	Light Air	Ripples with appearance of scales; no foam crests	Smoke drift indicates wind direction; vanes do not move
2	4-7	4-6	6-11	Light Breeze	Small wavelets; crests of glassy appearance	Wind felt on face; leaves rustle; vanes begin to move
3	8-12	7-10	12-19	Gentle Breeze	Large wavelets; crests begin to break; scattered whitecaps	Leaves & small twigs in motion; light flags extended
4	13-18	11-16	20-29	Moderate Breeze	1-4 ft. waves; numerous whitecaps	Leaves, & loose paper raised up; flags flap; small branches move
5	19-24	17-21	30-38	Fresh Breeze	4-8 ft waves; many whitecaps; some spray	Small trees begin to sway; flags flap & ripple
6	25-31	22-27	39-50	Strong Breeze	8-13 ft waves forming white caps everywhere; more spray	Large branches in motion; whistling heard in wires
7	32-38	28-33	51-61	Near Gale	13-20 ft. waves; white foam blows in streaks	Whole trees in motion; resistance felt in walking against wind
8	39-46	34-40	62-74	Gale	13-20 ft. waves; edges of crests begin to break; foam in streaks	Whole trees in motion; resistance felt in walking against wind
9	47-54	41-47	75-86	Strong Gale	20 ft. waves; sea begins to roll; dense streaks of foam	Slight structural damage occurs; shingles blow from roofs
10	55-63	48-55	87-101	Storm	20-30 ft. waves; white churning sea; rolling is heavy; reduced visibility	Trees broken or uprooted; considerable structural damage occurs
11	64-74	56-63	102-120	Violent Storm	30-45 ft. waves; white foam patches	Widespread damage to trees & buildings
12	75+	64+	120+	Hurricane	45 ft.+ waves; white sea; driving spray	Severe & extensive damage

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Buck-N-Blue Outdoors
P.O. Box 2121
http://www.jbrau.com/fun/bnb-bfrt.htm
08/12/03

Appendix E- Ferruginous Hawk Data and Map Sheet

Date (DDMMYY): Quadrat #: Start Time: End Time:
Observers: Total Hours:
General Weather Conditions:

Habitat Summary % Cultivation: % NP: % Tame:
% Not Surveyed:
Are potential nesting structures present? Description:
Site Photo Taken?
Site Photo Coordinates and Direction:

Species Summary Species Nests Adults Young

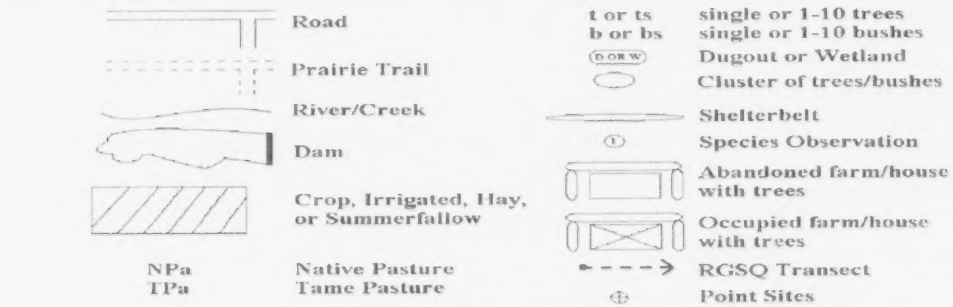
Species Observations UTM NAD 83

ID	Species	Nests	Adults	Young	Activity	Easting	Northing
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Observer Comments:

RANGE

TWP


Road
Prairie Trail
River/Creek
Dam
Crop, Irrigated, Hay, or Summerfallow
NPa Native Pasture
TPa Tame Pasture
t or ts single or 1-10 trees
b or bs single or 1-10 bushes
D OR W Dugout or Wetland
Cluster of trees/bushes
Shelterbelt
1 Species Observation
Abandoned farm/house with trees
Occupied farm/house with trees
RGSQ Transect
Point Sites

Appendix F- Raptor Nest Data Sheet

Observer: **Date:** **Time:**

Species:

Datum: **Northing:** **Easting:**

Number of Adults?		Number of Young?	
Nesting location (circle) Tree Shrub Nesting Pole Ground Other	Describe (incl. tree species):	Height of Tree/Shrub/Pole in meters: Height of nest in meters:	
Ground squirrels present?	Y / N		

800m x 800m

Circle the percent composition of each habitat class within 400 m of the nest. If not present leave blank.	Cultivation Dryland	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Cultivation Irrigation	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Tame Pasture	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Native Graminoid	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
Topography (circle) Rolling Hills Flat Plains Coulee or Valley Other	Shrubs	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Riparian	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Wetland	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Lake	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Treed	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Other	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%

Additional Features – indicate yes or no and circle closest distance to nest

Barbed Wire Fence	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Roads (Gravel, Paved, or Trail)	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Power Lines	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Buildings (Active or Abandoned)	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Other:	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400	

Long-Billed Curlew Monitoring Surveys

Brandy L. Downey, MULTISAR: The Milk River Basin Project, Lethbridge, AB

1.0 INTRODUCTION

The long-billed curlew (*Numenius americanus*) is declining throughout its range and is currently considered a "May be at Risk" species in Alberta (Alberta Sustainable Resource Development 2001) and a "Species of Special Concern" in Alberta and Canada (AESCC 2000, COSEWIC 2003). A lack of data on the species prompted the development of a provincial inventory for Alberta Fish and Wildlife Division in 2001 (Saunders 2001). The survey found that long-billed curlew abundances were associated with the amount of native prairie habitat available. Following the 2001 inventory a monitoring program was developed which was comprised of 20 long-billed curlew routes. Eight of these routes are located within the Milk River Basin and were completed as part of MULTISAR: The Milk River Basin Project in 2003. The monitoring program was completed by Canadian Wildlife Service (CWS) in 2002, and by Alberta Fish and Wildlife in 2003. Alberta Conservation Association assisted through completing several of the 2003 surveys.

2.0 METHODS

In 2001, 110 transects were designed for the long-billed curlew inventory, from this 10 transects from each habitat stratum were to be chosen for the annual monitoring program (Saunders 2001). The transects were divided into one of 3 stratums; stratum 1 (0-5% native prairie), stratum 2 (6-50% native prairie) and stratum 3 (50-100% native prairie). Stratum 1 and 2 were found to yield similar results and are therefore combined into one stratum for monitoring. As a result, 20 transects were required for the monitoring program. In 2002, CWS combined the long-billed curlew routes with new transects within the Alberta Grassland Natural Region for the Linkage project (Franken et al. 2003). Alberta Fish and Wildlife Division selected 20 of the 27 long-billed curlew transects used by CWS for continued monitoring in 2003, 8 of which were in the Milk River Basin.

The surveys were timed to coincide with the long-billed curlews breeding and nesting period; which starts in late April and ends in the first week of June (Saunders 2001). Each survey began half an hour before sunrise and on average took 5 hours to complete. At the start of each survey weather conditions, and the start time were recorded; changes in weather conditions were tracked throughout the survey. Persistent precipitation and winds in excess of 25 km/hour were considered unsuitable. If the survey was over half completed when weather conditions turned unfavorable, it would be included in the final analysis and not repeated.

Each 32km transect was divided into 40 stops, 800m apart. At each stop the observer would listen and scan for a total of 5 minutes, if a long-billed curlew was detected the stop number, number of birds, sex, activity and distance from the observation point was recorded on the long-billed curlew data sheets (Appendix G). All birds with in 800 m or

greater were recorded. Males only were included in the analysis as females tend to incubate the nest during the day and are therefore less visible (Saunders 2001). In addition only long-billed curlews within 400 meters of the observer will be included in the analysis. The 2002 data only recorded birds within 400 meters, however the observers did not discern between male and female birds (Franken et al. 2003). It will be assumed that all birds recorded during the 2002 survey were male.

In addition to the long-billed curlew, 6 incidental priority species were recorded on the same data sheet. These species include ferruginous hawk (*Buteo regalis*), short-eared owl (*Asio flammeus*), burrowing owl (*Athene cunicularia hypugaea*), upland sandpiper (*Bartarmia longicauda*), loggerhead shrike (*Lanius ludovicianus exubitorides*), and Sprague's pipit (*Anthus spragueii*). Weather conditions, end time and the number of stops were recorded at the end of each survey. Habitat data was determined not to differ significantly from 2001 therefore was not collected in 2003. However copies of the original data were given to each observer, and changes were made if necessary.

Due to the fact that only a sub sample of the original surveys was repeated, it is not possible to do a population estimate. However it is possible to determine population trends by utilizing linear regressions analysis (Cerney and Jones 2003). These will illustrate if the population is increasing, decreasing or if there is no change between sample years. In order to prevent inconsistencies the routes should be resampled within +/- 5 days of the original survey and approximately 10 surveys should be done in each of the two stratums.

3.0 RESULTS

In the Milk River Basin there were 7 routes in stratum 3 and 2 routes in stratum 1 completed in 2003 (Table 2.3.1). In total 24 long-billed curlews were detected during the surveys; an additional 48 were detected as incidental species within the basin.

Table 2.3.1 2003 Long-billed Curlews and Incidental Species Observed for Selected Routes in the Milk River Basin.

Year	LBCU	SPPI	SEOW	FEHA	LOSH	BUOW	UPSA
2001	67	44	0	12	0	0	16
2002	*28	89	0	7	6	0	0
2003	82	125	7	8	5	0	9

* only counted within 400m.

The 2001 study was designed as an inventory study whereas the 2002 and 2003 surveys were designed for monitoring the trends in numbers of long-billed curlew. Therefore an estimate of the current population of the long-billed curlew is not possible; however the current population trend can be determined through regression analysis. Though there was an increased number of long-billed curlews detected during the survey there is not a significant increase or decrease in the population ($p = 0.436$).

4.0 DISCUSSION

The current species specific monitoring program utilized for the long-billed curlew was successful in detecting the species however a few inconsistencies in surveying should be addressed prior to future surveys. Though there were no significant changes to the population, long-billed curlew detection on several individual routes appeared to differ drastically between years. These few routes that appeared to differ did not follow survey protocol and were not sampled within +/-5 days of the original survey, which may have caused the inconsistencies in the data. One route differed by 35 days; this meant the surveys were completed in two different phases of the breeding season. On this route the 2001 survey was completed near the start of the nesting season whereas the 2003 survey was not conducted until June 5 at which time the young may have hatched and the family unit may have moved away from the transect. The difference in time between surveys may skew future population trends. In the future greater attention to the timing of the individual surveys should be taken into account.

The 2002 surveys were initiated as a multi-species inventory and not a long-billed curlew monitoring program. Due to this, the timing of the survey did not coincide with the long-billed curlew breeding period and the methodology differed from the 2001 and 2003 surveys. Several assumptions were made to ensure the data from the 2002 surveys could be analyzed with the 2001 and 2003 data. Though this did not significantly affect the results of the survey it is recommended that future long-billed curlew studies be done during the appropriate season, and not during the (usually later) breeding bird surveys.

The surveys further supported the positive relationship between long-billed curlews and native prairie habitat. In the Milk River Basin 90% of the long-billed curlews observed were found in stratum 3 (high native prairie). This may be attributed to the high percentage of native prairie in the basin compared to other areas in the provincial monitoring program. Though the long-billed curlew utilizes agricultural land, native prairie is still the primary habitat utilized by the bird. Due to this strong correlation and the current status of the long-billed curlew in Alberta and the rest of Canada, steps should be taken to ensure the conservation of native prairie habitat. These include continued monitoring of the species, stewardship programs and conservation management plans. This will ultimately benefit the long-billed curlew as well as other species dependent on native grasslands.

5.0 FUTURE MANAGEMENT RECOMMENDATIONS

- Continue yearly monitoring of the long-billed curlew to determine population trends.
- Establish a specific time line for each individual route to avoid inconstancies in the data between years.
- Create a CD with known calls of the long-billed curlew and the other six key species for participants to decrease chance of identification errors.
- Initiate stewardship programs for native prairie habitat in suitable areas to benefit the long-billed curlew as well as other wildlife with similar habitat requirements.

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Long-billed Curlew

Appendix G
Habitat Field Form

Date entered on: _____
By: _____
Spreadsheet Name: _____

Sample Route Number: _____

Date Completed: _____ Completed by: _____

Enter "100" in one box or "50" in two boxes (where habitat differs on either side of the transect. On very rare occasions you may have to enter "25" in four boxes.

Additional habitat notes can be recorded on back

Stop	Native Grassland		Tame Pasture		Cultivated		Riparian		Other	GPS INFO	
	Ungrazed	Grazed	Irrigated	Dryland	Irrigated	Dryland	Lentic	Lotic	description	Easting	Northing
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
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37											
38											
39											
40											

Long-billed Curlew
Inventory

Route Description Form

Sample Route Number: _____

Date Reconnaissance Completed on:

Start UTM:

	DESCRIPTIONS (You do not have to describe every stop, just where there is potential for confusion when you do the curlew survey OR if someone else were to repeat the survey). Please indicate where turns occur and in which direction as well as the LAST STOP (some routes are less than 40km)
1	
2	
3	
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9	
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11	
12	
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Long-billed Curlew Inventory

Curlew Field Form

Survey Route Number:_____
Observer:_____
Date:_____
Start Time:_____End Time:_____

Weather Information: **Start**	**End**
Calm Light breeze Mod. Breeze Windy	Calm light breeze Mod. Breeze Windy
Sunny Partially Overcast Overcast	Sunny Partially Overcast Overcast
Temperature:___°C	Temperature:___°C
Light rain Light Snow	Light rain Light Snow

Date Entered on:_____
Data Entered by:_____
Excel Filename:_____

Odometer reading at Start: Number of Stops:

Stop #	Species code	Location 1=0-400m 2= 400-800m 3=>800m North, South, East, West	Sex Undeterm. Male Female	Age Adult Juvenile	Activity Use BSOD activity codes	Habitat Ngrass, Tpasture, Cult, Rip	Comments (include if first 3 minutes or last 2 minutes)

Loggerhead Shrike Surveys Within the Milk River Basin

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1.0 INTRODUCTION

The prairie loggerhead shrike (*Lanius ludovicianus excubitorides*) is a predatory songbird of the open grasslands, which is currently ranked as a "Sensitive" species and a species of "Special Concern" in Alberta (Alberta Sustainable Resource Development 2001) and ranked as "Threatened" by COSEWIC in western Canada (Johns et al. 1994). Loggerhead shrike populations have been declining over the past few decades throughout their range, including Alberta (Collister 1994). The Milk River Basin contains a small population of loggerhead shrikes, with 69 occurrences, as of February 2004, in the Biodiversity/Species Observation Database (BSOD). The majority of sightings were recorded around Onefour and Writing-on-Stone Provincial Park, which are heavily used as research sites by universities, conservation groups, and biologists. Loggerhead shrike surveys in southern Alberta were conducted in 1986, 1987, 1988, and yearly since 1998 by road transects. The road transects were conducted in the western part of the basin around Whiskey Gap and Del Bonita, and the central part of the basin around Writing-on- Stone Provincial Park, Coutts, and Milk River. Studies by Bjorge and Prescott (1996) found that within their east central Alberta study area, around Hanna and Oyen, 42.6% of loggerhead shrikes would have been missed by road transects. The objectives of the Milk River Basin surveys were to develop a more intensive survey method for loggerhead shrikes, identify new sites, and determine habitat use of the species to enable habitat mapping. Anecdotal sightings were also noted while conducting other surveys.

The loggerhead shrike surveys in 2002 and 2003 utilized two survey methods in an effort to determine which survey would be the most effective for the Milk River Basin. Quadrat surveys and roadside surveys were tested, as well as the use of call playback in order to enhance observability of loggerhead shrikes while conducting the two surveys.

2.0 METHODS

2.1 Quadrat Surveys

Sites to be surveyed were randomly selected by assigning numbers to each of the townships within the basin. A random numbers table was generated, and the first 20 numbers were used. Then, a second random numbers table was created to determine which sections southeast corner would be the start of the 6.4km by 6.4km survey quadrat for each township. If overlapping occurred between quadrats, the next number on the table was selected as the starting point. The size of the quadrats was chosen to correspond with similar loggerhead shrike studies conducted by Bjorge and Prescott (1996) on existing ferruginous hawk quadrats (6.4km by 6.4km). All twenty quadrats (Figure 2.4.1) were highlighted on 1: 250,000 maps.

Quadrats surveys were conducted by one observer driving (~ 40km/hr) around the 6.4km by 6.4km quadrat in search of loggerhead shrikes or potential habitat. When potential

habitat was found, the observer stopped and intensively scanned the area for loggerhead shrikes. Landowner permission was gained to access suitable loggerhead shrike sites away from roads for intensive surveys to be conducted. These intensive surveys involved the observer walking the area in search of nests or signs (e.g. impaled prey) that indicated a loggerhead shrike occupied the area. When loggerhead shrikes were seen, the observer completed the data sheets (Appendix H) consisting of habitat information for the area, any nest information when available, GPS locations (UTM NAD 83), date, band information, and number of individuals seen. In 2002, sites were surveyed between mid to late July due to project staff being busy with amphibian surveys. The 2003 surveys took place between mid-May, when nesting is initiated, to early July.

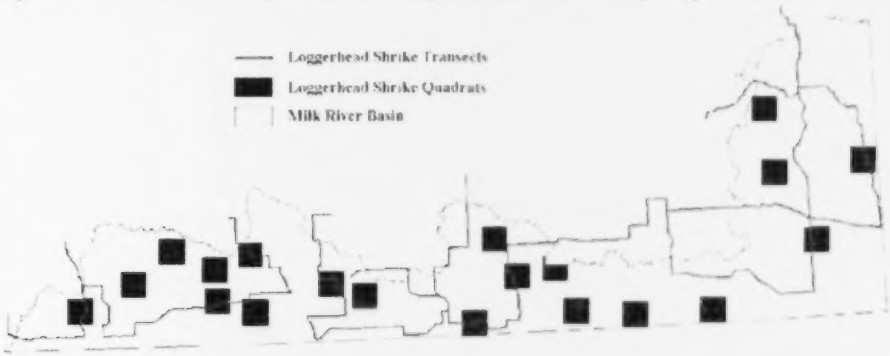

Figure 2.4.1 Loggerhead shrike survey transects and quadrats within the Milk River Basin

2.2 Road Transects

Two road transects which intersect the Milk River Basin were conducted in 2002 and five in 2003 (Figure 2.4.1). Surveys were conducted by two observers; one followed a predetermined route driving between 50km/hr and 70km/hr while the second observer scanned the area for loggerhead shrikes (Erickson 1998). Surveys were started at 0700 hours and were completed by 1500 hours. When suitable habitat was spotted, the driver stopped the vehicle and both observers scanned the area with binoculars and spotting scopes from the truck. When loggerhead shrikes were seen, habitat characteristics (Appendix H) and GPS locations (UTM NAD 83) were recorded. Additional avian species were also counted while conducting the survey (Appendix I).

2.3 Call playback as a Tool to Enhance Observations

Loggerhead shrike adult alarm calls were played opportunistically during quadrat surveys and road transects in areas containing numerous shrub complexes using a CD on a Dennis Kirk game caller. Alarm calls were played in order to entice the loggerhead shrikes into flying to more visible locations. The observer played the alarm call for 30 seconds while scanning the area with and without the aid of binoculars. Upon completion of the 30 second call playback the observer would then scan again for any signs and listen for sounds of loggerhead shrikes. Data was collected, as described above in quadrat surveys, when loggerhead shrikes were seen.

3.0 RESULTS

A total of 11 sites containing loggerhead shrikes were found within or near the Milk River Basin in 2002 (Downey and Taylor 2003). In 2003, 17 sites were found within or near the basin (Figure 2.4.2).

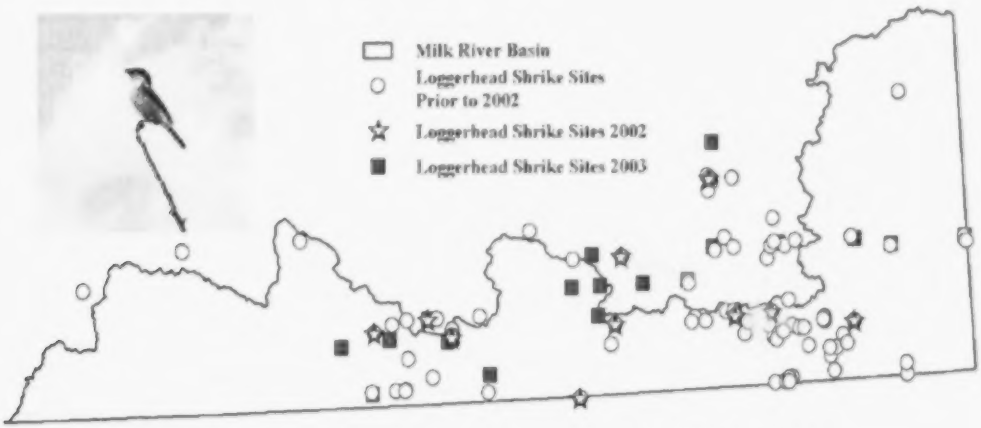

Figure 2.4.2 Known loggerhead shrike sites within the Milk River Basin

3.1 Quadrat Surveys

Quadrat surveys conducted in 2002 (Downey and Taylor 2003) were continued in 2003 with an additional 10 completed for a total of 14 quadrats surveyed. One quadrat containing a lone loggerhead shrike was recorded in 2002, while in 2003 two quadrats, each containing a pair of loggerhead shrikes, were recorded (Table 2.4.1).

3.2 Road Surveys

Six road transects which intersect the Milk River Basin were conducted as part of the National loggerhead shrike survey in 2003. The surveys resulted in the identification of six sites within the basin containing loggerhead shrikes (Table 2.4.1). In 2002, only one loggerhead shrike was seen outside the basin while conducting road transects.

3.3 Call playback as a Tool to Enhance Observations

Call playback surveys were conducted at potential sites identified by field crew during surveys within the basin. Call playback of the loggerhead shrike call aided in the identification of three sites within the basin (Table2.4.1). In both cases the loggerhead shrike flew up out of taller vegetation and perch in a visible location.

3.4 Anecdotal Sightings

Sixteen additional sites (Table 2.4.1) were located while conducting other surveys such as the long-billed curlew (*Numenius americanus*) and burrowing owl (*Athene cunicularia)* surveys in 2002 and 2003. These sightings occurred while driving other survey routes not driven for the National loggerhead shrike surveys.

Table2.4.1 Loggerhead Shrike Survey Method Comparison

Survey Method	2002		2003	
	# Conducted	# Sites Occupied	# Conducted	# Sites Occupied
Quadrat Surveys	4	1	10	2
Road Transects	2	1	5	6
Anecdotal sightings	N/A	9	N/A	9
Call Playback (used during one of the above methods)	1	1	6	2

3.6 Habitat Survey Summary

Seventeen sites within or near the Milk River Basin, containing a total of 25 adult loggerhead shrikes and 17 young (Figure 2.4.3), were found in 2003. Native grassland (Figure 2.4.4) was again the most abundant habitat averaging 32.8 %, dry land cultivation was found to compose 26.6% and farmyards replace tame pasture for third highest at 11.5% (Table 2.4.2). There was a difference in a loggerhead shrike's average habitat compared to 2002 results as a result of more detailed surveys recording farmyards as one unit instead of splitting them up into farmyards and tamed pasture, as was done in 2002. The recording of rights of way and dominant shrubs was also added in 2003.

Figure 2.4.3 Loggerhead shrike young in nest

Figure2.4.4 Ideal loggerhead shrike habitat

Table 2.4.2 2003 Milk River Basin loggerhead shrike habitat within 200 meters of initial sighting

2003	*Shrike Site																	
Habitat	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**Average (%)**
%Cultivation (dry land)		30		45	50	40	55	40	10	30			35		20	45	30	26.6
%Tame Pasture							15						15					1.9
%Native Pasture	55	35	75	40	20	15			80	30	90	45		50	40	10	20	32.8
%Riparian	15		10										5	20				2.5
%Shrubs (scattered)											5			30				2.2
%Shrubs (hedgerows)		20		10	10	10	5	10		10		20	15		10	5		7.7
%Shrubs (dense clumps)	25																	1.5
%Farmyard (*abandon*)					15	20	10	*(35)*		25		25	*(20)*				35	11.5
%Trees		5	5			10	5	10	5			5	5		5	5	10	4.3
%Other			5												20	30		3.4
%R.O.W	5	10	5	5	5	5	10	5	5	5	5	5	5		5	5	5	5.6
**Dominant Shrub	W	C	P	C	C	C	SI	C	W	C	SA	C	SI	T	C	C	SI	

*Shrike site numbers do not correspond to the 2002 table (Downey and Taylor 2003)
**Dominant Shrubs: C= Caragana; P= Plains Cottonwood; T= Thorny Buffaloberry; W= Willow; SA= Sagebrush; SI= Siberian Elm

4.0 DISCUSSION

Road surveys that stop at suitable habitat and use call playback appear to be the best means of finding loggerhead shrikes in the Milk River Basin. Wershler (1987) also identified that road surveys which stop at apparently suitable habitat will increase the number of loggerhead shrikes observed. Most anecdotal observations were made from road transects when observers stopped and scanned habitat or when loggerhead shrikes flew up to power lines. Call playbacks provided a valuable tool in surveying for loggerhead shrike's when extensive habitat existed or when obstacles prevented the observer from initial visual observations. Quadrat surveys, although beneficial in other parts of Alberta (Bjorge and Prescott 1996), required large amounts of time and cost to concentrate on the relatively small areas of suitable habitat within the Milk River Basin. The low results (3 occupied sites), large time requirements, and limited suitable habitat within quadrats, caused this survey method to be re-examined. It was determined that quadrat surveys were not an effective means of surveying for loggerhead shrikes in the Milk River Basin. The relatively low or sometimes absence of shrubs in these quadrats makes it more efficient to seek potential habitat sites throughout the basin (i.e. by road transects) rather then concentrating large amounts of time on random quadrats.

The average loggerhead shrike habitat results from 2002 (Downey and Taylor 2003) and 2003 reflect the loggerhead shrike's preference for edge habitat or ¼ sections containing a variety of habitat types within close proximity (Bjorge and Prescott 1996). All sites were found within or adjacent to pastures (native and tame) or farmyards. In areas with higher cultivation, there was an apparent association with farmyards and the shrubs and grass associated with them. Grass height preference by loggerhead shrikes (Prescott and Collister 1993), which seem to vary depending on geographic locations, were not identified when evaluating habitat but will be included in future surveys. This may

explain the absence of loggerhead shrikes in apparently suitable habitat within the Milk River Basin and beneficial management practices (e.g. changes to grazing regimes) could then be implemented to enhance the habitat for loggerhead shrike. At every site except one, rights of way (roads and railways) and barbwire fence were present. These two features allow loggerhead shrikes to easily catch and store their prey. At the only site with no fence or right of way the loggerhead shrikes had an abundance of thorny buffalo berry for impaling prey (Dechant et al. 2001). This site was adjacent to the Milk River, and also had an open shoreline for hunting.

The arid environment of the Milk River Basin restricts most native shrubs to riparian corridors. The lack of native shrubs in other areas increases the use of exotic shrubs, caragana and Siberian elm, found in farmyards. The dominant shrubs (Table 4) in areas occupied by loggerhead shrikes in 2003, caragana (9) and Siberian elm (3), highlight the importance of farmyard hedgerows and exotic shelterbelts (Bjorge and Prescott 1996) in expanding loggerhead shrike habitat within the Milk River Basin. Farmyards also provide edge habitat, where several habitat types can be found within short distances, which are preferred by loggerhead shrikes.

Highway 4 continues to act as the loggerhead shrike's western range boundary, within the Milk River Basin, with no loggerhead shrikes located west of it although suitable habitat appears to exist. Continued emphasis will be place on searches for loggerhead shrikes at potential sites in the western part of the basin that has been identified as suitable through HSI modeling.

5.0 MANAGEMENT AND RECOMMENDATIONS

- Monitor sites that are used by loggerhead shrikes yearly to determine productivity between years.
- Implement beneficial management practices to maintain sites that have a history of supporting loggerhead shrikes.
- Implement beneficial management practices to enhance sites that have potential for loggerhead shrike habitat.
- Carry out more intensive habitat information gathering on grass height and species of grass to further aid in identifying the best beneficial management practices.
- Search areas west of Highway 4 (Milk River Ridge), which are highlighted as highly suitable habitat based on HSI modeling.
- Use road transects stopping at appropriate habitat and using call playback for surveying loggerhead shrikes within the Milk River Basin.

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Appendix H- Loggerhead Shrike Habitat Data Sheet

Brian Hoffman

Observer: **Date:** **Time:**

Wind Speed (Beaufort Scale): 1 2 3 4 5 6 7 8 9 10 11 12

Location: **Northing** **Easting**

Bird Data

How Many Seen			
Were any Birds Banded:	Y N	Color of band (left leg):	
Birds Activity:		Color of band (right leg):	
Perching location: (If more then one bird is seen, indicate both perching locations)	Fence post Power line Barb wire Shrub	Height from the ground to perching location:	

% Micro Habitat (200m radius)

Cultivation Dry land		**Tame Pasture**		**Riparian Lentic**	
Cultivation Irrigation		**Native Pasture**		**Riparian Lotic**	
Shrubs (scattered)		**Shrubs (hedgerows)**		**Shrubs (dense clumps)**	
Farmyard		**Trees**		**R.O.W.**	
Abandoned Farmyard		**Other:**		**Other:**	

Species of Shrubs/Trees within 200m radius. (Indicate the percent composition of each species within the area.)	**Thorny Buffaloberry**	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Willow	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Caragana	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Populus: Plains, Balsam, Narrowleaf	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
Additional Comments:	**Manitoba Maple**	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Siberian Elm	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Sagebrush	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Snowberry	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Saskatoon	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Chokecherry	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Spruce	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Other	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
Other Wildlife Species Observed:						

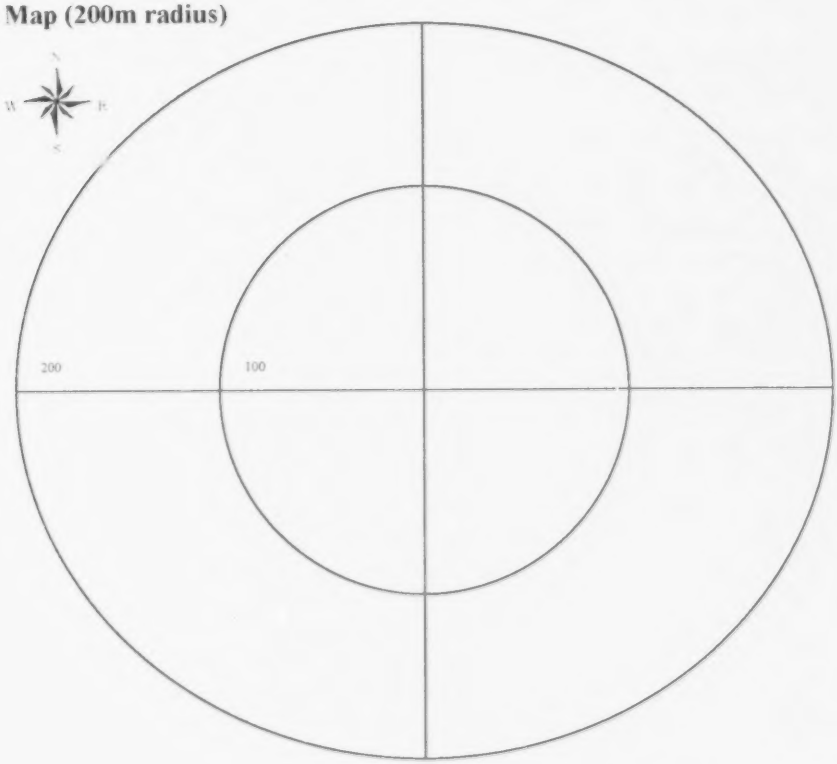
Barb Wire Fence	Y N	Distance from shrike 0-50m, 50-100m, 100-150m, 150-200m, 200m+
Power Lines	Y N	Distance from shrike(m): 0-50m, 50-100m, 100-150m, 150-200m, 200m+
Buildings	Y N	Distance from shrike (m): 0-50m, 50-100m, 100-150m, 150-200m, 200m+
Other	Distance from shrike (m): 0-50m, 50-100m, 100-150m, 150-200m, 200m+	

Nest Data

Species of Shrub/ Tree			**Height of Shrub/Tree**		
Nest Material (Mark from 1-3 with 1 being the most abundant)	Grasses 1 2 3 Forbs 1 2 3 Feathers 1 2 3 Fur/Hair 1 2 3 Twigs 1 2 3 Other:		**Width of Shrub/ Tree**		
Number of Eggs		**Height of Nest**		**Site Fidelity** Y N	Since
Number of Young		**Age of Young**		**# Fledged**	

Grass Height (random plots in each quadrat)	NW Avg		NE Avg		SW Avg		SE Avg.	

Site Map (200m radius)



Appendix I- Species of Interest

While conducting national loggerhead shrike surveys information was opportunistically collected on additional species of interest. Turkey Vultures (*Cathartes aura*), although secure in Alberta are rarely seen in the Milk River Basin as well as one Common Poorwill (*Phalaenoptilus nuttallii*), which are data deficient was encountered.

Species	*Status	Number Seen
Ferruginous Hawk (+young)	At Risk	31
Dead Bullsnake	Sensitive	1
Turkey Vulture	Secure	3
Common Poorwill	Undetermined	1
Short-eared Owls	May Be At Risk	3
Black-crowned Night Heron	Sensitive	2
Long-billed Curlew	May Be At Risk	10

* Alberta Sustainable Resource Development 2001

CHAPTER 3

FISHERIES

Surveys of Aquatic Refugia - 2003

Brad A. Downey, Alberta Conservation Association, Lethbridge, AB

1.0 INTRODUCTION

Aquatic refugia are an important habitat in tributary streams to the Milk River. They provide sites for fish, amphibians, waterfowl, and other aquatic life to survive in during low flow periods (i.e. drought, winter). Fish that persist in refugia can re-colonize other areas of the stream, once adequate flows return (Clayton 2003). Re-colonization from refugia within a stream is likely faster than re-colonization from downstream mainstems, because of the shorter distances involved. Aquatic refugia can also act as watering holes for wildlife, especially during dry years in the Milk River Basin. High precipitation events in 2002 resulted in identification of many potential aquatic refugia, but also led to some doubt as to the persistence of the identified refugia on the landscape in drier years. 2003 was a drier year, during which it was appropriate to reconfirm identified aquatic refugia. Aquatic refugia are an important feature in the Milk River Basin, and their presence has been used as a "bonus point" in the development of multi-species conservation values (MCVs) for each quarter section in the basin (Jones and Downey 2004).

2.0 METHODS

Surveyors revisited sites classed in 2002 as likely fish refugia. Photographs were taken of the sites to compare changes between years. The fish refugia surveys were conducted in the late summer of 2003, following a dry summer and the dewatering of significant lengths of most tributaries. If water was present, then depths were taken to compare to water level data in future years. Reaches of tributaries that weren't surveyed in 2002 were examined for potential refugia sites.

3.0 RESULTS

Sixteen of the 21 sites sampled in 2002 were resurveyed in 2003. Eight of the sites were dry and three of the sites held a small amount of water, but not enough water (< .5 meters) to over winter fish (Appendix J). Six refugia were newly discovered along Lonely Valley Creek (n=4) and Van Cleave coulee (n=2), all with depths of greater than 1 meter.

4.0 DISCUSSION

Extreme weather events in spring and summer 2002 filled most streams and ponds in the basin to above normal levels. These precipitation events led to the identification of several sections of tributaries as potential aquatic refugia. The drier year of 2003 provided an opportunity to confirm aquatic refugia. Pictures in the appendix comparing refugia between years show the dramatic change of some apparently good refugia in 2002 to dry holes in 2003. Additional sites that were identified in 2003 more accurately

represent true refugia sites within the basin. Identification of fish refugia should, when the occasion arises, be conducted during the fall of drought years since sites holding water at this time would be the most resilient deeper pools, important to protect as fish refugia. Further investigations and sampling of fish refugia will occur in the fall of 2004.

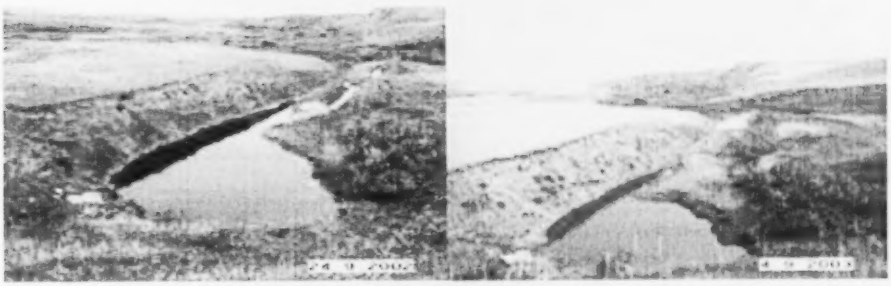
5.0 LITERATURE CITED

Clayton, T.B. 2003. Milk River Basin Tributaries Project. Pages 22-37 in Quinlan, R.W., B.A. Downey, B.N. Taylor, P.F. Jones and T.B. Clayton (eds.). A multi-species conservation strategy for species at risk in the Milk River basin: year 1 progress report. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 72, Edmonton, AB.

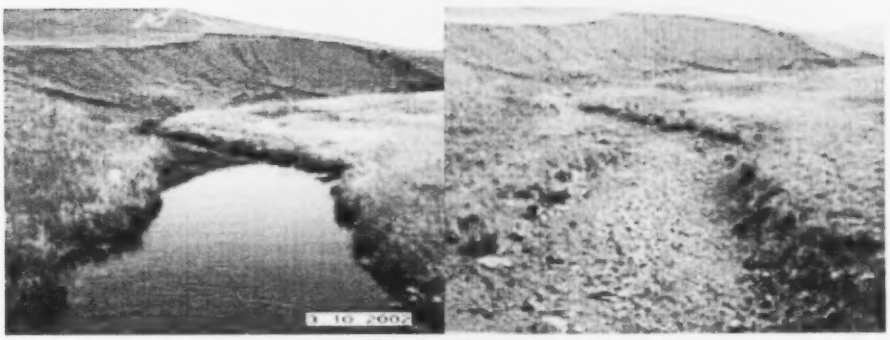
Jones, P.F. and B. L. Downey. 2004. A multi-species conservation value. Pages 100-106 *in* Quinlan R.W, B. A. Downey, B. L. Downey and P. F. Jones. 2004. MULTISAR: The Milk River Basin Project, A Multi-Species Conservation Strategy For Species at Risk: Year 2-Progress Report . Alberta Sustainable Resource Management, Fish and Wildlife Division, Alberta Species at Risk Report No. 87, Edmonton, AB.

Appendix J- Fish Refugia

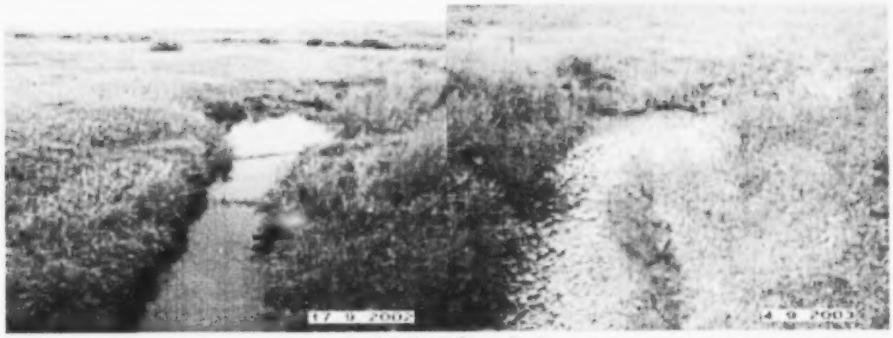
Bear Creek



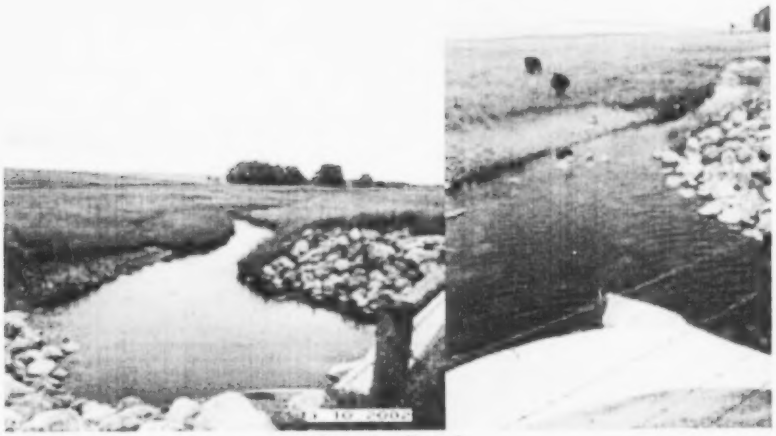
Breed Creek



Shanks Creek

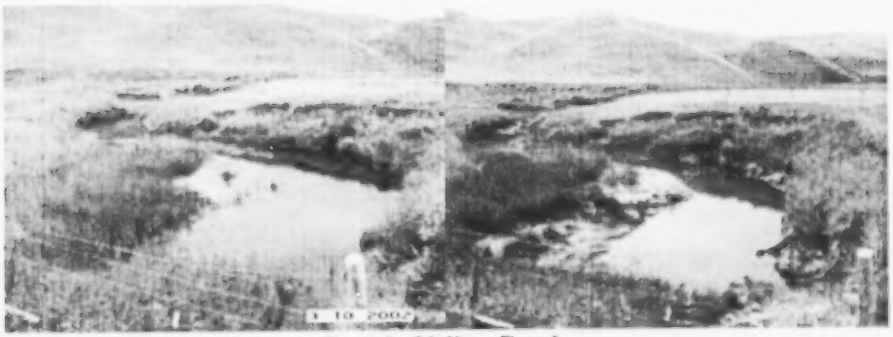


Lodge Creek



Shanks Creek

Sage Creek



Lonely Valley Creek

Van Cleave Coulee

CHAPTER 4

HERPTILES

Amphibian Surveys of the Milk River Basin

Brandy L. Downey, MULTISAR: The Milk River Basin Project, Lethbridge, AB

1.0 INTRODUCTION

Amphibian call surveys were initiated in the Milk River Basin in 2002 to determine the habitat associations and distribution of all amphibians in the area (Taylor and Downey 2003). The call surveys were specifically aimed at the detection of the plains spadefoot (*Spea bombifrons*), great plains toads (*Bufo cognatus*) and the northern leopard frogs (*Rana pipiens*). The two toads are currently ranked " May be at Risk" species in Alberta (Alberta Sustainable Resource Development 2001). The northern leopard frog is considered "At Risk" in Alberta and is legislated as a Threatened species in Alberta's Wildlife Act. These surveys were successful at detecting plains spadefoot and great plains toads; however few northern leopard frog were detected during the 2002 surveys. Due to this a secondary survey method, based on Kendall's 2002 protocol, was initiated specifically aimed at the detection of northern leopard frogs in 2003.

2.0 METHODS

Potential northern leopard frog breeding sites were identified along the Milk River floodplain during a raptor aerial survey on May 27, 2003. These sites were visited in late July to early August in 2003. The surveys are timed to coincide with the dispersion of young of the year from their natal ponds. The number of frogs present is higher during this time, which increases the chance of detecting the species. Observers walked around the edge of each pond looking for frogs, or tadpoles. If a northern leopard frog was found the location, and the habitat features were recorded on northern leopard frog data sheets (Kendall 2002) (Appendix K).

3.0 RESULTS

Several ponds identified for study in 2003 dried up prior to the survey period. Consequently only two sites were surveyed, and no frogs were found. An incidental observation was recorded in 2003 along Michel Reservoir, where one small egg mass was found with 5 northern leopard frogs (Romanchuk 2003). During a second visit the observer noted a change in water levels and only detected two northern leopard frogs. The small egg mass was no longer present and no new egg masses were observed. Due to the low detection rates no analysis was completed for the species.

4.0 DISCUSSION

The majority of the sites selected were dry by the time surveys were conducted. This can be attributed to the extreme dry conditions experienced in 2003. The dry conditions of the region severely limits the number of permanent water bodies in the basin. It is recommended that future survey sites be selected during the fall fish refugia surveys.

This will more accurately identify potential northern leopard frog breeding and overwintering ponds for study.

5.0 FUTURE MANAGEMENT AND RECOMMENDATIONS

- Identify potential northern leopard frog breeding sites during the fall fish refugia and revisit the sites in the spring.
- In addition to shoreline searches for frogs carry out spring egg mass searches in suitable wetlands.

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Appendix K

NORTHERN LEOPARD FROG, PLAINS SPADEFOOT, AND GREAT PLAINS TOAD SURVEY SHEET

	Data Sheet of	Data Entered yes No	BSOD #
Observer		Date (dd/mm/yyyy)	
Site name		ANHIC #	BSOD #
Landowner/Contact		Home Quarter	Phone #
Locality surveyed	UTM North Latitude:	UTM East Longitude:	NAD 27 NAD 83
	¼ NW NE SW SE Sec:	Sec: Twp: Rg:	W of: 4 5
Map/air photo #			

Weather	Clear P. Cloudy Overcast Rain	Air (°C) [a]	Beaufort Wind Scale [b]	1 2 3 4 5 6	
Visual (number)	Time (24 hr)	Start:	End:	Total:	Area Searched (m) π

Species	Adult	Sub Adult	Young of Year	Larvae/Tadpole	Egg mass
NLFR					
GPTO					
PLSP					

Route # (when applicable)		Stop # (when applicable)		Date	
Calling	Time (24 hr)	Start:	End:	Total:	

Species →	NLFR	GPTO	PLSP		
Individual counted-no overlapping calls (one)					
Individuals counted-no overlapping calls (two +)					
Calls distinguishable-calls overlapping (several +)					
Full continuous chorus-calls not distinguishable (many)					

Water (°C) [c]	Turbidity	Clear	Cloudy	Soil Type	Clay	Sandy	Silt Gravel
Origin	Natural	Man-made	Drainage [d]	Outflow	Inflow	None	
Waterbody Description	Permanent Lake/Pond	Temporary Lake/Pond	Marsh/Bog	Stream	Spring/Seep	Beaver Pond	Other (note)
Water Flow [e]	None	Slow	Moderate	Fast	Estimated Depth	< 1 m	1-2 m > 2 m
Primary Substrate	Silt/Mud	Sand/Gravel	Cobble	Boulder/Bedrock	Other (note):		
Percent of Margin with Emergent Vegetation	0	1-25	25-50	>50			

Emergent Vegetation Species (order of abundance) & Height				

Notes: (Management comments or concerns, potential or actual disturbances to site; other species observed, specimen(s) collected, site photographed, identification problems, etc.)

WOF R	Wood Frog
BCFR	Boreal Chorus Frog
PLSP	Plains Spadefoot
NLFR	Northern Leopard Frog
CATO	Canadian Toad
TISA	Tiger Salamander
GPTO	Great Plains Toad

Site Map:

N

Map Legend

Area searched

Location of call survey

Visual Observations

Adult, sub-adult, YOY

egg mass

Call Survey

Adult Calling

Indicate actual numbers beside symbol with estimated counts in brackets

Please include

- Roads, fences

Brief description of directions to site:
Additional comments:

2003 Reptile Surveys of the Milk River Basin

Brad A. Downey, Alberta Conservation Association, Lethbridge, AB

1.0 INTRODUCTION

The Milk River Basin in southern Alberta contains a unique landscape, which is home to seven of Alberta's reptiles: five species of snakes, the only native turtle species, and the only native lizard species. Reptile surveys were conducted for prairie rattlesnake (*Crotalus viridis viridis*), bullsnake (*Pituophis catenifer*), and garter snake (*Thamnophis spp.*) hibernacula as well as short-horned lizards (*Phrynosoma hernandesi*), and western painted turtles (*Chrysemys picta*) in the Milk River Basin in 2003. The prairie rattlesnake and short-horned lizard are considered "May be at Risk" while bullsnakes, all three garter snakes, and western painted turtles are considered "Sensitive" in Alberta (Alberta Sustainable Resource Development 2001). A wet year in 2002 left the majority of the short-horned lizard sites to be surveyed in 2003.

2.0 METHODS

Surveys for prairie rattlesnake, garter snake, and bull snake hibernacula took place in mid to late May and early to mid September, with road mortality data sheets being filled out throughout the field season. Short-horned lizard surveys were completed in late July and early August, when the females were giving birth (James 2003), and anecdotal western painted turtle sightings were recorded in May 2003.

2.1 Hibernacula and Short-horned lizard Surveys

Survey methods were used as identified in (Downey and Taylor 2003)

3.0 RESULTS

3.1 Snakes

Nine snakes were found killed along roads in 2003 within the Milk River Basin, 5 prairie rattlesnake, 3 bull snakes, and 1 plains garter snake (Table 3.2.1). Several other sightings of snakes crossing roads were also noted. Plains garter snakes were observed crossing roads in late April - early May while bull snakes and prairie rattlesnake mortalities and observations weren't noted until July through to September.

Table 4.2.1 Snake road mortalities from 2003

Species	Date	Number	Length (cm)
Bullsnake	July 3, 2003	1	85
Bullsnake	August 7, 2003	1	150
Bullsnake	September 26, 2003	1	35
Plains Garter Snake	April 24, 2003	1	30
Prairie Rattlesnake	September 4, 2003	1	50
Prairie Rattlesnake	September 4, 2003	1	25
Prairie Rattlesnake	September 5, 2003	1	50
Prairie Rattlesnake	September 5, 2003	1	100
Prairie Rattle Snake	September 26, 2003	1	87

Eleven hibernaculas were identified and habitat information collected in 2002 and 2003 (Table 3.2.2). Because of the wet weather, sites found in 2002 (Downey and Taylor 2003) were revisited in 2003 to determine yearly use of the hibernacula and to confirm whether they were still active. Hibernaculas (Figure 3.2.1) surveyed in early September of 2003 all contained neonates, which were absent in September 2002 surveys. Surveys have yielded limited garter snake hibernacula information and continued effort will be made in 2004. Communal denning of prairie rattlesnakes (PRRA), bullsnake (BULL), and plains garter snakes (PGSN) has been recorded in the basin.

Table 4.2.2. Snake hibernacula characteristics within the Milk River Basin

Species	Aspect	Slope (Degrees)	Date	Temp C°	#	Activity	Habitat	Confirmed Hibernacula in 2003
BULL	S	25	16-May-02	10	1	Basking near Entrance	Hibernacula/Rookery, 80%Shrubs, 10% Native Grass,10% Dirt/Rocks	Found in 2002- none seen in 2003
BULL/ PRRA/ PGSN	S	15-20	16-May-02	10	3 of Each	Basking near Entrance	Hibernacula, 60% Shrubs, 35% Native Grass, 5% Dirt/Rocks	Confirmed 2003 early September- 3 PRRA two of which were neonates. Spring search resulted in 2 BULL, 1 PRRA, and 1 PGSN.
PRRA	S	20	16-May-02	10	1	Basking near Entrance	Hibernacula/Rookery, 75% Shrubs, 20% Native Grass, 5% Dirt/Rocks	Found in 2002 –none seen in 2003
PRRA	S	25	1-Aug-02	17	1	Basking near Entrance	Hibernacula, 20% Shrubs 40% Native Grass, 40% Dirt/Rock	No snakes in 2003 however six sheds were seen at hibernacula
PRRA	SE	45	5-Sept-03	20	2	Basking near Entrance	Hibernacula 90% Grass, 10% Dirt/Rock	Old site-Confirmed in 2003 with two snakes, one was a neonate. Sheds were also seen inside.
PRRA	SW	45	5-Sept-03	20	6	Basking near Entrance	Hibernacula 90% Grass, 10% Dirt/Rock	Old site-Confirmed in 2003 with six snakes, five being neonates. Could be many more but tall grass near entrance prevented accurate count. Found 200m west of site immediately above.
PRRA	SW	5	14-May-03	19	1	Moving around top of rocks	Hibernacula 5% Shrubs, 20% Grass, 75% Dirt/Rocks	Site found in 2003 with very pale (whitish) looking snake.
PRRA	SW	N/A	14-May-03	20	1	Curled next to rock	Hibernacula 20% Shrubs, 2% Grass, 78% Dirt/Rocks	Site found in 2003 about 200m east of site immediately above
PRRA	SE	30	3-Oct-03	20	4	Seen just outside entrance in shrubs and tall grass	Hibernacula 40% Shrubs, 15% Grass, 45% Dirt/ Rocks	Old site confirmed in 2003. One large 1.5m PRRA was seen with two 50cm ones and a lone neonate.
PRRA	SE	35	3-Oct-03	19	2	Both were seen in the entrances of holes	Hibernacula 15% Shrubs, 25% Grass, 60 % Dirt/ Rocks	Old site confirmed in 2003. Two PRRA were seen one with eleven rattles. Numerous snake tracks were seen leading in and out of the den.
PRRA	S	25	3-Oct-03	24	1	Seen in shrub above hibernacula	Hibernacula 15% shrubs, 4o Grass, 45% Dirt/Rocks	Old site confirmed in 2003. Lone PRRA seen with no rattle

Figure 4.2.1 Hibernacula entrance in rock face with prairie rattlesnake

3.2 Short-horned Lizards

Three of the 10 sites identified for surveys in 2003 were searched with no short-horned lizards (Figure 3.2.2) seen. The drought in 2003 (fire hazard) prevented the other survey sites (Figure 3.2.3) from being reached during the appropriate times. All three sites contained suitable habitat however vegetation heights were higher at one site compared to 2002. Habitat modeling on this species identified additional sites for surveys, which contain suitable habitat, unfortunately no short-horned lizards were found.

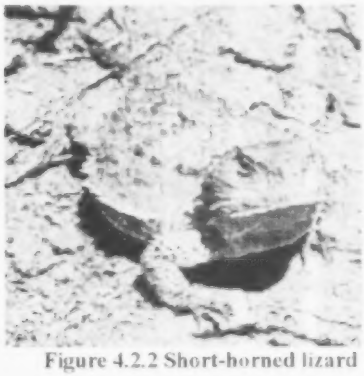

Figure 4.2.2 Short-horned lizard

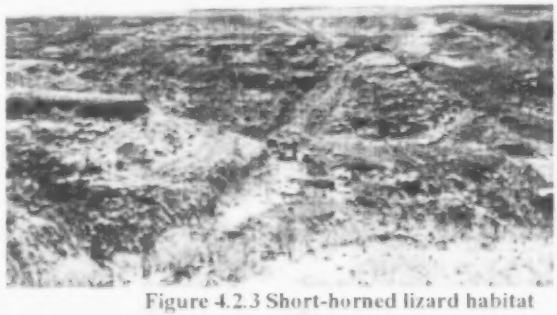

Figure 4.2.3 Short-horned lizard habitat

3.3 Western Painted Turtles

One anecdotal sighting of western painted turtles was made at Michel Reservoir in May of 2003. Two turtles were seen, however only one could be confirmed as being a western painted turtle, using a small pond attached to the reservoir. The pond was approximately 1.5 meters at its deepest point with limited emergent and aquatic vegetation. No floating debris was seen in the pond for basking. Time constraints prevented surveys in 2003 at their known native site, which will now be conducted in 2004

4.0 DISCUSSION

The wet weather severely hampered most of the reptile surveys conducted in 2002. Fortunately 2003, although warmer then usual, provided ideal conditions for snakes and all prairie rattlesnake hibernaculas contained neonates by early September. Each hibernaculum confirmed in 2003 contained at least one neonate and one adult and were found generally facing south. Plains garter snakes were finally confirmed within the basin in 2003, with four sightings occurring within the basin, three in the east and one in the western part of the basin. Bullsnakes were not as prevalent on surveys in 2003 compared to 2002 however a possible nesting and mating site was identified and will be monitored in 2004. Other then dead bullsnakes on the road the other five bullsnakes identified in 2003 occurred in the eastern part of the basin, four in Writing On Stone Provincial Park and one within the Pinhorn grazing reserve.

In 2003 short-horned lizard surveys where hampered yet again only this time by extremely dry conditions resulting in a reluctance of landowners in allowing surveys on their land. The elusiveness, small size, and camouflage abilities of this species prevents us from dismissing its absence and surveys will be continued in 2004 for Alberta's only lizard.

The absence of turtles at their native site in 2002 (Downey and Taylor 2003) and identification of them in other parts of the basin (Michel Reservoir) in 2003 emphasizes the need for intensive inventories to be conducted on this species. Basking platforms at the Michel Reservoir site may need to be looked at to enhance turtle habitat. A western painted turtle survey within the Milk River Basin looking at native sites and unconfirmed sightings will be conducted in 2004. Additional sites may be identified through cooperative and voluntary stewardship activities with local landowners.

Reptile conservation within Alberta is an important component of the MULTISAR Project and continued work with landowners in the area on stewardship programs in 2004 will help protect these elusive species and their fragile habitat.

5.0 MANAGEMENT AND RECOMMENDATIONS

- Continued surveys for short-horned lizards and western painted turtles to better understand their habitat and distribution.
- Educational pamphlets on reptiles to be dispersed within the communities.
- Work with landowners during stewardship programs to educate them on the benefits of reptiles.

6.0 LITERATURE CITED

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CHAPTER 5

MAMMAL IVENTORIES AND PROTOCOLS

Richardson's Ground Squirrel Trend Surveys in the Milk River Basin

Brad A. Downey, Alberta Conservation Association, Lethbridge, AB

1.0 INTRODUCTION

Richardson's ground squirrels (*Spermophilus richardsonii*) are distributed throughout the grasslands and are a key component to the prairie ecosystem. Smith (1993) and Michener (1996, 2002) identify Richardson's ground squirrels as a vital prey source for ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), prairie rattlesnake (*Crotalus viridis*), American badger (*Taxidea taxus*), and long-tailed weasel (*Mustela frenata*). Prey species population fluctuations can have dramatic effects on predator populations. Schmutz and Hungle (1989) found a strong correlation between ferruginous hawks and the number of ground squirrels based on cans of poison purchased by landowners.

Several survey methods have been explored and used on ground squirrels. These range from intrusive approaches such as mark- release-recapture to less intrusive surveys such as burrow entrance count and visual observation. The use of alarm calls to help increase observability of individuals has also been used with notable increases in numbers seen (Lishak 1977, Leung 1991, Hare and Atkins 2001). Visual observations of adult Richardson's ground squirrels was chosen as the most cost effective and efficient way of surveying for Richardson's ground squirrels across the Milk River Basin (Downey 2003).

Ground squirrel inventories were conducted in 2003 within the Milk River Basin. We examined the difference in Richardson's ground squirrels observed using a call playback versus no call playback. I examined if ground squirrels were using habitat in proportion to its availability. Results from these surveys will be combined with other surveys within the basin and the Grassland Natural region to examine relationships between ground squirrels and ferruginous hawks (Downey 2004).

2.0 METHOD

2.1 Survey Conditions

Emergence of young may vary 2-3 weeks between years depending on the severity of the winter and geographic location (Michener and Schmutz 2002). Surveys were therefore conducted during the first three weeks of April to ensure that all adult ground squirrels had emerged from hibernation and were above ground. This allowed the maximum adult density to be assessed each year. April surveys of adults were chosen to alleviate the biases that could result from the emergence of juveniles (Downey 2003).

Morning surveys started 75 minutes after sunrise and ended by 1200 hours. Afternoon surveys were conducted from 1600 hours until 75 minutes prior to sunset. These survey periods correspond to when ground squirrels are most actively feeding. Due to reduced levels of activity, surveys did not occur during extremely high temperatures (30 °C).

when winds exceeded 30 km/hr, or when there was inclement weather such as snow or rain (NatureServe Explorer 2001, Downey 2003, G. Michener pers. comm.).

2.2 Point Site Visual Surveys

Point site surveys involved an observer driving and stopping every 800m along a 12.8km (8 mile) predetermined transect. The observer used binoculars and started the survey at a recognizable point then rotated around 360 degrees (four 90° quadrants) counting each ground squirrel within 200m during a 2-minute period. In cases where quadrants couldn't be surveyed the full 200m due to obstructions such as topography the observers continued along the transect (up to 400m from the original site) until they could see 200m in each direction. Any changes in the locations of the stops were noted on the data sheet. Regular intervals of stops every 800m were continued from where the original stop was located. The number of Richardson's ground squirrels seen in each quadrant (NE, NW, SE, and SW) was recorded on the data sheet. The dominant habitat for each quadrant and the habitat in which ground squirrels where seen were recorded. Detailed survey protocol can be found in Downey (2003).

2.3 Call Playback Survey

On completion of the first count the observer played a recording of the alarm call of an adult Richardson ground squirrel for 30 seconds while facing each quadrant and counting the number of ground squirrels observed. Results of both counts were recorded to determine whether playback of alarm calls assists in increasing observability (Downey 2003).

3.0 RESULTS

3.1 Call Playback versus Observation

Large differences in Richardson's ground squirrel numbers occurred between the 5 blocks surveyed within the Milk River Basin. Observations of Richardson's ground squirrel adults along transects within the blocks ranged from 1 to 35 (Table 5.1.1).

Table 5.1.1 Comparison of the number of Richardson's ground squirrels seen using the two survey methods within the Milk River Basin.

Block #	# of RGSQ seen without call playback	# of RGSQ seen with call playback
1	6	15
3	0	1
5	12	35
18	20	34
30	4	14
Total	**42**	**99**

3.2 Habitat Selection

Habitat information was collected on 332.5 sites. The analysis showed that habitat was not used in proportion to availability ($X^2=27.84; p<0.005$). Native pasture was selected more often then available while cultivation was selected less often then available (Table 5.1.2).

Table 5.1.2 Habitat selection by Richardson's ground squirrels in the Milk River basin of Alberta in 2003

Habitat	# of Quarters	# Of quarter sections with RGSQ 's observed	Expected	Bonferoni 95% confidence intervals LL-UL	Category
Cultivation	167.5	10.5	27.7068	.027-.355	Less
Native pasture	123.5	39	20.4286	.519-.898	Greater
Tame pasture	41.5	5.5	6.8647	-.025-.225	No Diff
SUM	332.5	55			

4.0 DISCUSSION

4.1 Richardson's ground squirrel survey method

Call playback is an effective means of surveying for grounds squirrels across vast areas. Lishak (1977) counted 44-47% more thirteen-lined ground squirrel using call playbacks versus no call playbacks. Results from the 2003 surveys show that alarm calls aided the observer in seeing ground squirrels and this survey method will be continued for future trend surveys. Call playback of a Richardson's ground squirrel alarm call allows one to count actual individuals rather then relying on evidence of the species occupying the area. Direct observations allow less discrepancies arising from whether burrows are being used or not, what species produced the burrows, and how many ground squirrels can use one burrow complex.

4.2 Habitat analysis

Habitat analysis indicated greater use of grasslands over cultivation by ground squirrels. Smith (1993) states the preferred habitat of Richardson's ground squirrels is extensive short and mixed grasslands. Similar results by Schmutz (1989) suggest Richardson's ground squirrels occupy cropland at lower densities.

5.0 MANAGEMENT IMPLICATIONS

Preservation of native grassland will aid in supplying ferruginous hawk with a sufficient prey base as well as providing habitat for a variety of other species. Management and stewardship programs, which promote native grassland and the prevention of tilling, are key in protecting the grassland habitat.

The results from this survey will be combined with results of other surveys occurring within the basin and the Natural Grassland Region (Downey 2004). The scope of this other project is larger and will examine the relationship between ground squirrel and how it might affect the number of ferruginous hawk on inventory blocks. Additional factors that may influence ferruginous hawk use of blocks such as active farmyards and available nest sites were also examined (Downey 2004). Competition from other hawks such as red-tailed hawks (*Buteo jamaicensis*) and Swainson's hawks were also looked at as restricting ferruginous hawks from nesting in areas with abundant ground squirrels (Downey 2004).

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Owl Pellet Collection for a Small Mammal Study

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1.0 INTRODUCTION

Owl pellets were collected across the basin from abandoned farmyards and tree nest that were known to be used by owls from surveys conduct in 2002-2003 as well as from an abandoned farmstead study in 1999 (Cerney 2000). Owl pellets have been an excellent source for identifying reclusive small mammals in large study areas and have been used by Schowalter (2000), and Schowalter and Digby (1997, 1999) in Alberta to identify small mammal populations.

2.0 METHODS

Sites were selected from the Alberta Conservation Association Abandoned Farmstead program. Landowner permission for the perspective sites was gained prior to the survey. Two field technicians equipped with proper safety gear searched all old buildings and sheds in each site for owl pellets. Each technician was equipped with an AO 5 Star Respirator, which had R51HE-P100 filter cartridges that filtered 99.97% of contaminates (i.e. hanta virus). Latex gloves were used for handling the pellets, which were placed in brown paper bags. Time of the collection, location, collector, and date were all written on the paper bags, which were then placed in zip lock bags to be frozen. The pellets were sent to Edmonton where proper sterilizing facilities exist to dissect owl pellets. Schowalter (2000) describes the proper sterilization techniques for dissecting and handling of owl pellets.

3.0 RESULTS

Identification of small mammals from owl pellets collected in 2003 will be completed in 2004.

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Long-tailed Weasel Survey Protocol

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1.0 INTRODUCTION

The long-tailed weasel (*Mustela frenata*) has the largest range of all the weasels in North America (Zielinski 2000). Due to historical hunting pressure, and habitat loss the long-tailed weasel's population has started to decline over much of its range (Proulx and Drescher 1991, Sheffield and Thomas 1997). The long-tailed weasel is currently considered a May be at Risk species in Alberta (Alberta Sustainable Resource Development 2001). Despite this status only a few studies on its distribution and population have occurred in Alberta. Two of these studies involved interview and questionnaires, designed to identify target areas and develop future inventory protocols for the long-tailed weasel (Proulx and Drescher 1991, Scholwalter 2000). Though these surveys yielded some information on the long-tailed weasel, there has been no quantitative follow up to the surveyed areas and therefore little comprehensive data on the species in Alberta. To better understand the range and habitat requirements of the long-tailed weasel a standardized inventory protocol is required. To meet with this requirement several objectives have been identified.

- Research the biology and ecology of the long-tailed weasel
- Review and compare past survey methods for the long-tailed weasel in Alberta and North America
- Determine a survey methodology to provide habitat and population data for the long-tailed weasel.
- Design and evaluate the survey protocol.

Past survey methods used in Alberta and North America were evaluated on their ability in obtaining population and habitat data for the long-tailed weasel. The methods were compared and assessed based on their manpower, funding and time requirements. Based on the ultimate goal of the survey and resources available a survey method was selected.

2.0 BIOLOGY AND ECOLOGY

2.1 Physical description

The long-tailed weasel is brown in colour with a soft white to yellow belly during the summer (Ansems 2003). In northern parts of their range the weasels changes to white with a black tipped tail for camouflage during the winter. The average male is 416-469 mm long and weight between 242.3-423.7 g; the females are smaller and on average are 363-408 mm long and weight 154.3-242.6 g (Smith 1993).

The long-tailed weasel has the characteristic long slender body, short legs and five-toed foot with sharp non-retractile claws (Zielinski 2000). The shape of the weasel's body aids in pursuing prey underground, however the elongated body does present problems with

maintaining a consistent body temperature. Due to this the long-tailed weasel has an extremely high metabolic rate compared to other small mammals.

2.2 Phrenology

The long-tailed weasel is active for only a small portion of the day (Sheffield and Thomas1997). Due to their high metabolism, as much as 70% of the time they are active is spent in the pursuit of prey (Zelinski 2000) The long shape of the weasel's body enables it to pursue prey underground or snow. It is an opportunistic hunter and will prey on rodents, birds, rabbits and other locally available food sources (Ansems 2003). Unlike other mustelids, the long-tailed weasel is a generalist; consequently its population does not fluctuate based on a specific prey species availability. However as prey becomes scarcer it is known to travel long distance to secure food. Its population can be effected by extreme climatic changes, and predator abundance (Ministry of Environment 1998) Predators of the long-tailed weasel include foxes (*Vulpes vulpes*), coyotes (*Canis latrans*), martens *(Martes americana)* , bobcats (*Felis rufus*), and domestic dogs and domestic cats.

The long-tailed weasel maintains large home ranges; with a male's home range overlapping with several females. They are solitary creatures except during the breeding season, which occurs in the mid-summer months (Ministry of Environment 1998). During the mating season the males roam throughout their homerange in search for females. Implantation is delayed and the females do not give birth until the spring of the following year. The female alone cares for the altricial young for 6-12 weeks (Sheffield 1997, Ministry of Environment 1998). The young disperse in the summer and will occupy marginal habitat until they can locate and defend a territory (Ministry of Environment 1998). There is a high mortality rate for long-tailed weasels in their first year and few make it through the winter

2.3 Habitat requirements

The long-tailed weasel is flexible in its habitat requirements and will utilize late seral prairie, forest, and wetland habitats (Ministry of Environment 1998). Although the long-tailed weasel is an adapted to a variety of habitats it is restricted to areas of freestanding water and riparian zones, which play a key role in the dispersion and daily behavior of the weasel (Sheffield 1997, Ministry of Environment 1998).

There is some initial evidence that long-tailed weasel distribution is linked to black and dark brown soil regimes in Alberta however more research is needed for confirmation (Proulx and Drescher1991). There is little information on the microhabitat requirements of the long-tailed weasel in Alberta.

2.4 Distribution

The long-tailed weasel has the largest range of any mustelid in the Americas, ranging from South America through the Parkland region of Canada (Gamble 1981, Smith 1993). In Alberta it ranges from the Saskatchewan border to the British Columbia border and up into the southern end of the boreal forest region (Figure 5.3.1).

Figure 5.3.1 Long-tailed weasel Albertan Rang, (Smith 1993)

3.0 PAST SURVEY METHODS

3.1 Interviews and Questionnaire

Two interview and questionnaire surveys were conducted in Alberta during the nineties to determine the presence or absence of long-tailed weasels (Prolux and Drescher 1991, Scholwalter 2000). These surveys rely on memory and identification capability of the interviewees and are therefore not always reliable. However they are important in keying into local knowledge, which is often forgotten during scientific studies. Though this method does not yield comprehensive and reliable results it does allow for some generalizations, which can be used to narrow down areas frequented by the weasels for future studies. The two interview and questionnaire surveys already completed in the last ten years negates any need for a repeat at this time (Proulx pers comm.).

3.2 Mark and Recapture

The mark and recapture method is commonly used while surveying predator species in order to determine population densities. The method is highly invasive, which is problematic with this species (Ministry of Environment 1998). The high metabolism of the long-tailed weasel increases the chances of capture myopathy resulting in death. The surveys are also high in financial and labor costs, and may not be affordable in all regions. Due to these issues the mark recapture method is not deemed to be a reasonable inventory method for the long-tailed weasel in Alberta.

3.3 Camera/bait stations

Camera/bait stations are used in order to monitor species in a large study area with little intrusion and low manpower. The camera systems are often used on their own or as part of another survey such as mark/recapture or tracking surveys for conformation purposes (Zielinski and Kucrea 1995, Ministry of Environment 1998). The cost associated with camera systems are high and cannot always be done under the majority of budgets constraints. Though inexpensive camera systems have been researched, there are few documented results on their reliability (Jones and Raphael, 1993). In addition the variety of variables which can malfunction with this method decreases their reliability and makes them unsuitable as a single survey method (Fowler and Golightly 1994). Where applicable the camera bait stations are recommended as secondary detection device (Fowler and Golightly 1994, Zielinski and Kucrea 1995, Ministry of Environment 1998).

3.4 Snow Tracking

Tracking can be used to identify presence of the long-tailed weasel in certain areas (Zielinski et al. 2000). The amount and type of snow that falls in the study area dictates where and when the survey can occur. This method is not practical due to limited snowfall in the southern portion of the province and consistent presence of the Chinook winds melting snow cover.

3.5 Sooted-track plates

Suitable substrate for tracking is difficult to find in parts of Alberta. The sooted-track plate method creates its own track surface in which to obtain inventory data. This method

provides presence/absence data on species to be sampled without being overly invasive and can be accomplished at a relatively low cost (Zielinski and Kurcea 1995). The track-plates produce permanent records of the species, which allows for identification to take place at the office rather than in the field. In cases where it is difficult to identify a track, experts can be consulted eliminating the high degree of error associated with traditional track surveys (Fowler and Golightly 1994).

Problems may arise if the area is highly frequented which may cover or mark up important track data, therefore the areas must be visited often to ensure that data is not destroyed (Zielinski and Kurcea 1995). Long cold periods, precipitation, and high winds can negatively influence the results and should be addressed prior to the inventory (Ministry of Environment 1998).

4.0 SELECTED SURVEY PROTOCOL

4.1 Justification

Several factors were examined prior to the selection of a survey method for the long-tailed weasel. Based on the literature review manpower, financial cost, scale of the study, and species behavior were weighed to determine the ideal study method (Table 5.3.1). Based on these criteria the sooted-track plate method was determined to be best suited to study long-tailed weasels in Alberta.

Table 5.3.1 Comparison of Survey Method

Method	Time allocation	Manpower	Cost	Technical Difficulty	Precision	Quality of Results
Interview/Questionnaire	Low	Low	Low	Low	Low	Low
Mark and Recapture	High	High	High	High	High	High
Remote Camera Station	Medium	Low	High	High	Medium	Medium
Snow Tracking	High	High	Medium	Low	Low	Low
Sooted-track Plates	High	Medium	Initially High	Low	High	High

Sooted-track plates have been proven to be a reliable method at detecting several species of mammals (Fowler and Golightly 1994, Luce et al. 2000, Taylor and Raphael 1988). All of these studies were focused on the detection of species other than the long-tailed weasel. However the long-tailed weasel was consistently detected as an incidental species, illustrating that the sooted-track plate are a reliable method for long-tailed weasel detection. The method is also technically simple, provides reliable results and can be maintained at a relatively low cost (Fowler and Golightly 1994).

4.2 Survey Method

It is important to limit survey biases and create a uniform study protocol for the species, for the purpose of this survey several assumptions must be made in order to ensure accuracy.

- Sooted-track-plate stations are far enough a part as not to effect other station.
- All possible habitat types are represented in the study area.
- Surveys do not occur during drastic population change.

- Survey protocol is followed exactly.
- Permanent records are produced to lower chance of error in identification.

4.3 Study Area

There are three spatial scales at which to survey a species; provincial or regional scale, landscape scale, or site level (Fowler and Golightly 1994). The literature review of the various survey methods have brought attention to the fact that a provincial monitoring survey may not be possible for this species. The majority of the detection methods, including the sooted-track plate method, that have proven to be successful at locating long-tailed weasel are costly, time consuming or both. Many of the methods are ideal for monitoring the species on landscape or site level, however it would be difficult to apply them on a large provincial scale. Therefore the sooted track plate method is designed to be applied on a landscape level within Alberta.

4.4 Survey Timing and Conditions

Past sooted-track studies typically have detected the long-tailed weasel in the late spring to early summer (Fowler and Golightly 1994). Based on this the recommended survey period is between the end of March and the end of May. During this period, prey items are scarce and the long-tailed weasel is more active in its search for food; thus increasing the chance of it encountering a station.

Though early spring is the ideal survey period, the weather is not always cooperative and may negatively influence results (Fowler and Golightly 1994). Therefore several steps should be taken to ensure the survey is accurate. Although long-tailed weasels do not hibernate, during extreme cold weather and high winds their activity levels decrease (Zielinski 2000). Therefore weather conditions should be monitored prior to the commencement of the study and throughout the study period (Ministry of Environment 1994). Surveys should not be done in temperatures below -10^{0}C and in winds higher than 25 km/hr. If an extreme cold snap occurs than the survey may be extended to accommodate the weather. Additionally snow can damage the sooted-track plate, therefore if a precipitation event occurs during the survey period the stations are to be revisited and damaged plates should be replaced. Blowing snow can be a problem in Southern Alberta. Due to this the open ends of the station should face north south to avoid the prevailing westerly winds.

4.5 Survey Duration

Jones and Raphael (1993) found that 60% of martens were detected between days 8-11 in sooted-track plate studies. As there is no such data for the long-tailed weasel detection using sooted-track plates the time period will be assumed to be the same. Based on the Jones and Raphael 1993 study the recommended time period is 14 days. This will allow enough time for the detection of the target species and for effective time management of field staff.

4.6 Survey Site Selection

The survey transects will be selected based on historical records from the Biodiversity/Species Observation Database (BSOD), results from the two interview

survey previously conducted and on known habitat associations of the long-tailed weasels. The long-tailed weasel is flexible in its habitat requirements therefore a representative sample of each habitat type within the study area should be selected (Ministry of Environment 1998). However emphasizes should be placed on waterways as long-tailed weasel uses them at a significantly higher rate than other habitat features (Smith 1993, Zielinski 2000).

The transects will be 6 km long with 1 station placed every kilometer (Fowler and Golightly 1994). Each transect will be surveyed for a maximum of 14 days and consequently sites should be selected based on the number of transects that can be successfully monitored during the study period. Transects will be marked on 1:250000 topographical maps for reference in the field (Zielinski and Kucrea 1995).

4.7 Survey Setup

Six sooted-track plate stations will be set up along each 6 km transect for a 14 day period as based on Fowler and Golightly's 1994 protocol. The sooted-track plates are spread out evenly, approximately 1 km apart and 50m from any roads or trail. If stations are placed to close to roads it may decrease the likelihood of detection of the long-tailed weasel and increase the chance of human disturbance (Zielinski and Kucrea 1995). The stations are given an identification number and the location is marked using a GPS unit. At each station a habitat evaluation form will be completed to assess the major habitat features, vegetative cover and amount of human disturbance in the area (Appendix L).

Each station must be checked every third day and therefore only the number of stations that can be realistically checked in the allotted time should be established (Fowler and Golightly 1994). The number of stations that can be monitored depends on the total access points to the sites and the number of personnel available. The day the station is baited is known as day 0 and every third day after this the station will be revisited for a maximum of 14 days, a total of 5 visits.

At each station a cubby should be placed on level ground to avoid movement upon entry (Zielinski and Kucrea 1995). If possible slant the open end of the cubby down to avoid precipitation from getting into it and the open ends of the cubby should face north and south to avoid wind damage. The cubby should be disguised to look like a natural den site using vegetative materials in the area (Fowler and Golightly 1994, Zielinski and Kucrea 1995). To avoid damage, the sooted-track plates and Con-tact paper should be covered and kept separate from the cubby until field setup, at which time the protective covers are removed and the Con-tact paper is placed sticky-side up and secured to the bottom of the cubby. Two sooted-track plates will be placed on either side of the cubby with the bait placed in the middle. This will allow for the animals to enter and exit from either side and will decrease the amount of damage to the track plates. After all the stations have been set up the bait should be added. A variety of bait can be used such as cat food, jam, and chicken (Ministry of Environment 1998). Fowler and Golightly (1994) found that marten detection was higher at stations baited with raw chicken or tuna cat food. For the purpose of this study cat food will be used.

4.8 Cubby Construction

Each station requires one plywood cubby containing two sooted track plates. The cubbies will protect the sooted-track plate from possible weather damage. In order to suit the long-tailed weasel the cubby should be built according to the guidelines set out below (Appendix M).

1. The cubby should be 10 cm wide, 10 cm high and 60 cm long.
2. 3 pieces of plywood will be nailed together.
3. The fourth piece will be attached to the top of the cubby using a hinge and a latch on the bottom. This will allow for the adding and removal of the sooted-track plates, bait and tracks without damaging the plate.
4. Attached to the top of each cubby a laminated notice will be placed (Zielinski and Kucrea 1995). The notice will read:

Please do not touch. This is part of an important wildlife study being conducted by Alberta Fish and Wildlife. The sooted track plate will record the tracks of animals; it will not harm or entrap them. If you have any question, please Contact,_____. Thank you

4.9 Sooted-track plate construction

Each sooted-track plate will be made to the following specifications (Appendix M).

1. An aluminum sheet will be cut into 10 cm wide and 20cm long bands.
2. The plates should be sooted using either an acetylene gas flame torch with its oxygen valve blocked with a piece of tape (Fowler and Golightly 1994). A smokey kerosene torch can be used instead. The soot can be added by holding the aluminum above the torch. This should be done in a well ventilated area.
3. White Con-tact paper should be attached to the last 1/3 of the track plate. The protective covering should be left on the Con-tact paper until the plate is placed in the cubby to avoid damage.
4. The Sooted-track plates should be stored in a slotted box or container until they are placed in the field.

4.10 Station Monitoring

During the 14 day period the areas should be visited every third day in order to take track samples, replenish bait, and check on the state of the sooted-track plate (Appendix N). If there is a large amount of traffic at one site or precipitation, the sooted-track plate can become ineffective and needs to be replaced (Ministry of Environment 1998). During each visit the weather, state of track plate, and number of tracks is recorded on a station result form. Tracks that are left on the Con-tact paper or on the track-plate should be covered using clear wide tape and transferred to heavy white paper. They should than be marked with the station number, date and species of animal and taken back to the office for analysis. Although the long-tailed weasel is the targeted species in this survey all tracks that are recorded on the Con-tact paper should be saved. Tracks from sooted-track plates can differ from tracks in natural substances such as snow. Taylor and Raphael's (1988) Identification of Mammal Tracks from Sooted Track Stations in the Pacific Northwest is designed specifically for the identification of tracks from sooted-track plates and should be used when possible (Zielinski and Kucrea 1995, Ministry of Environment 1998).

4.12 Analysis of Data

The purpose of this survey is to establish presence or absence of the long-tailed weasel within the study area. Therefore it is important to analysis where and when the species was detected (Ministry of Environment 1998). Habitat data collected at each site will be compared to determined habitat associations of the long-tailed weasel. Use-availability analysis will be conducted on the habitat data to determine the habitat preferences of the species (Lofroth 1984, Neu et al. 1974). The habitat data will also be used to create a predictive model of potential long-tailed weasel habitat. The model will illustrate areas that the long-tailed weasel may utilize. In an addition to the habitat analysis, the other tracks found in the same area will be examined, as they may be a clue to why the long-tailed weasel may or may not be present.

Survey effort will be analyzed, by comparing the number of nights to the first long-tailed weasel detection at each site (Jones and Raphael 1993). From this an average between number of weasels detected and surveying hours can be defined.

SE= FD/NN
SE- Survey effort
FD- First Detection
NN- Number of Nights, one night is equal to 1, 24 hour period.

5.0 SURVEY PROTOCOL AND EVALUATION

The first year of the survey will be used as a trial run with in parts of the Milk River Basin, in order to determine the effectiveness of the protocol at detecting the long-tailed weasel. If the survey is deemed to be effective in monitoring the long-tailed weasel, it will be continued on a larger scale within the basin.

Equipment Required

Track plate and Cubby construction Equipment

- Aluminum baking sheets
- Acetylene gas torch or Kerosene torch
- Plywood (for cubbies)
- Nails or screw
- Hammer or drill
- Con-tact paper
- Scissors

Field Equipment

- Maps of Study area (scale 1:250000)
- GPS Unit
- Data Sheets (Appendix B and C)
- Clipboard
- Pencil

- Thermometer and Wind gage
- Folding Shovel
- Aluminum sooted-track plate with Con-tact paper
- Cubby
- Cat food
- Canopener
- Wide clear packing Tape (for removal of tracks)
- Duct tape, nails and hammer for cubby repairs
- Plain White paper
- Binder with plastic folders for track print storage

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7.0 PERSONAL COMMUNICATION

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Appendix L- Long-tailed Weasel Sooted-Track Plate Habitat Form

Date: Block #: Station #: Observer: Landowner:

Location (Nad 83): Easting Northing
Meridian: Twp: Rge: Quarter section:

% Habitat features (400m radius) Record % cover of habitat feature and fill in additional habitat details (e.g. grass height.)

Topography: (circle one) Coulee Flat Plains Rolling Hills Valley bottom	Cultivation (Dryland/ Irrigation):	
	Native Prairie:	Grass height
	Tame Grass:	Grass height
	Riparian:	
	Treed:	
	Shrubs:	
	Farmyard (active/ abandoned):	Distance
	Other: (Type)	

Soil: Type:
(Read off Soil Maps back at office)

Riparian Zone

Distance to Station: Lentic/Lotic Permanent/Ephemeral
(Circle one)

River/creek name:

Approximate Width(m): Approximate Depth(m):

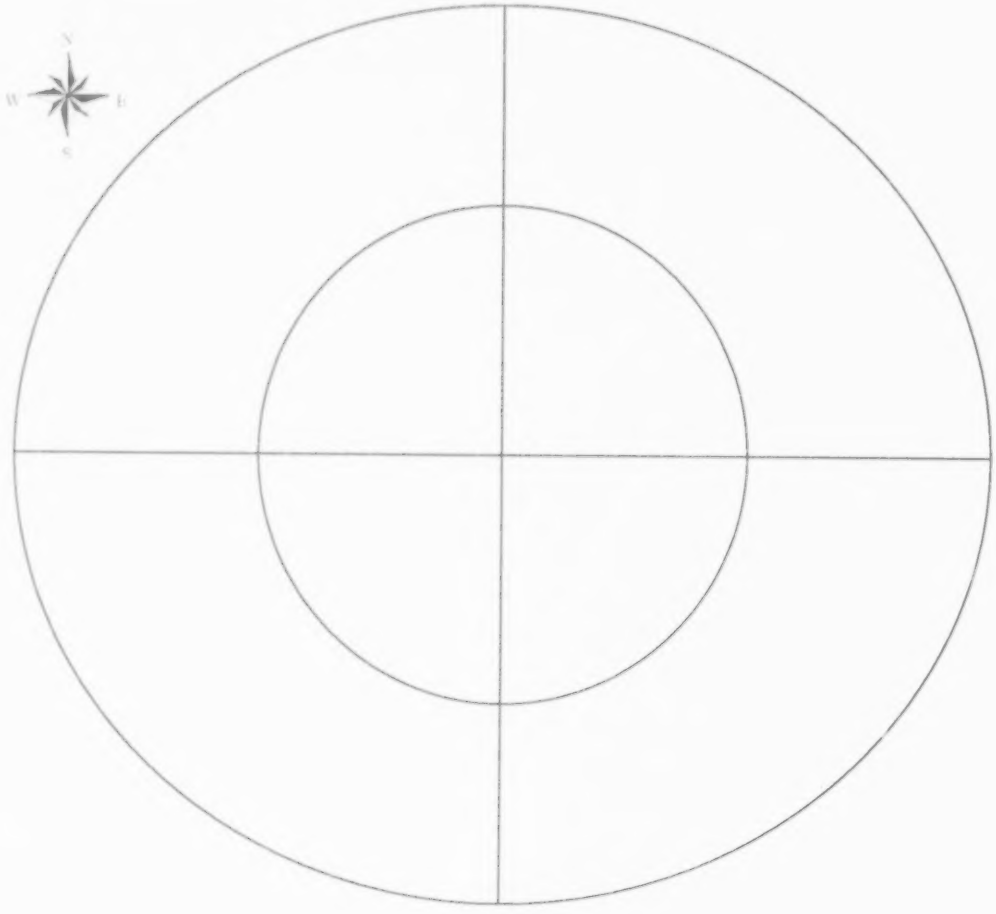
Approximate Width of Flood Plains(m):

Tree Species: Avg Height(m):

Shrub Species: Avg Height(m):

General Comments:

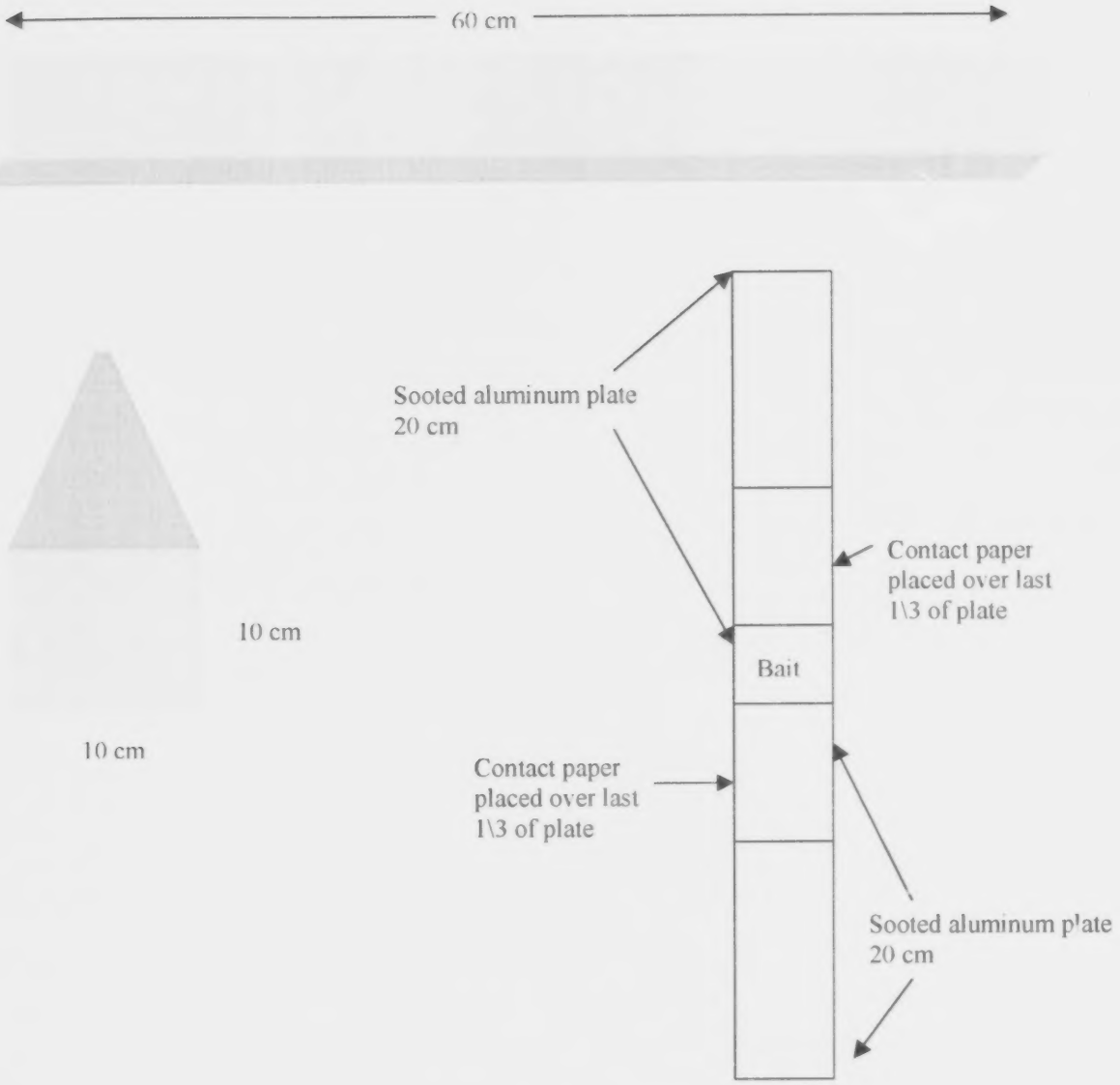
Diagram of 400m radius of Station Site



River
Road
Hedgerow / Shelterbelt
Shrub/Tree
5+ Trees/Shrubs
D/W Dugout/Wetland
Ephemeral Pond
Crop
NPsa Native Pasture
TPsa Tame Pasture
Alk Alkaline Soil

Barb wire Fence
Power Lines
Abandoned Farmyard
F Active Farmyard
C Corrals
W Windmill
B Grain Bins

Appendix M- Sooted-track plate and cubby



Appendix N- Sooted-track Plate Results Form

Location: Observer:
Easting: Northing Landowner:
Meridian: Twp: Rge: Quarter Section:

Date	Time	Weather Conditions last 48 hours	Day #	Replaced/ repaired track plate	Species ID	ID #	Comments

Western Small-footed Myotis Survey Protocol: The Milk River Basin

Brandy L. Downey, MULTISAR: The Milk River Basin Project, Lethbridge, AB

1.0 INTRODUCTION

The western small-footed bat (*Myotis ciliolabrum ciliolabrum*) resides in rocky riparian areas of southern Alberta, including parts of the Milk River Basin (Vanhof 2003, Laursen per comm.). This species is the only member of the Chiroptera family that is ranked as a "May be at Risk" species in Alberta, the species in not ranked in Canada (Alberta Sustainable Resources Development 2001, COSEWIC 2003). For the purposes of MULTISAR: The Milk River Basin Project, all at risk and may be at risk species that reside in the Milk River Basin will be monitored. This includes the western small-footed myotis. Recently a survey protocol aimed at standardizing bat surveys in Alberta was developed by Alberta Environment Natural Resource Services (Vanhof 2003, Lausen per comm.). This protocol provides methods and guidelines to standardize the data that is collected on bats in Alberta (Vanhof 2003). Therefore MULTISAR: the Milk River Basin project will adapt the methods set out in the Alberta protocol for monitoring the western small-footed myotis in the Milk River Basin. However the Alberta bat protocol is designed as a general survey method for all species of bats, consequently some alterations will be made to the protocol based on the habitat requirements and biology of the western small-footed bat.

2.0 BIOLOGY AND ECOLOGY

2.1 Physical Description

The western small-footed myotis is the smallest bat in Alberta. It is a pale yellow-brown to a grey-yellow colour on its back with an almost white underbelly (Van Zyll de Jong 1985 1985). The western small-footed myotis has a dark facial band across its eyes, dark medium length ears and black flight membranes (van Zyll de Jong 1985, Smith 1993, and Garcia et al. 1995). It has a keeled calcar (Van Zyll de Jong 1985, Smith 1993). It is distinguishable from other bats that utilize similar habitats by its small size, small feet and its distinctly keeled calcar.

2.2 Phenology

The western small-footed myotis relies on echolocation for orienteering and foraging purposes (van Zyll de Jong 1985, Garcia et al. 1999, and Smith 1993). The high frequency of the western small-footed myotis call indicates that it primarily feeds on small insects; however there is little information on exact prey species (Garcia et al. 1995, and Grindal et al. 1999).

Little is known about the reproductive behaviors and requirements of the western small-footed bat. It is believed that its reproductive cycle is similar to bats in temperate regions (Garcia et al. 1999). If this is true than the western small-footed bat typically reproduces when they are a year old (Garcia et al. 1999). Mating occurs prior to winter hibernation with the females storing sperm until the following spring (Garcia et al. 1999). The young

are born between June and July if weather and climatic factors are suitable (Garcia et al. 1999). The female gives birth to one young and occasionally twins.

2.3 Habitat Requirements

Riparian roles are key to the distribution and foraging requirements of the western small-footed myotis (Holloway and Barclay 2000, Van Zyll de Jong 1985, Seidman and Zabel 2001, and Smith 1993,). In Alberta they have been found to utilize cottonwood stands near cliff and rock edges and badland areas (Van Zyll de Jong 1985 1985, Smith 1993, and Lausen 2003). In the Milk River Basin the western small-footed myotis is usually found in areas of sildfed mud, highly eroded and rocky areas near cottonwood stands (Lausen per comm.).

Cliffs, clay banks, buildings and rock crevices are used as day and night roosts (Garcia et al. 1999, Holloway and Barclay 2000, Lausen and Barclay 2002). The western small-footed myotis constantly change roosting sites and few are utilized on consecutive nights. Hibernation sites differ slightly from roosting sites and are typically in caves or deeper rock crevices (Garcia et al. 1999).

2.4 Habitat Distribution

The western small-footed myotis range extends from the Saskatchewan border west to just west of Lethbridge and from the United States of America border north to Ramsey (Smith 1993). They are typically found along the Milk River, the South Saskatchewan River, and the Red Deer River south of Ramsey and in Dinosaur Provincial Park (Van Zyll de Jong 1985 1985, Smith 1993)

3.0 SURVEY PROTOCOL

3.1 Survey Method

The purpose of the western small-footed bat surveys in the Milk River Basin is to detect presence/absence of the species. There are two possible ways of detecting the presence and absence of the species, echolocation and capture/release (Vanhof 2003). It is typically recommended that these two methods be used in conjunction with each other to monitor bat population. This will ensure species of bats not detected by one method will be detected by the other. However the purpose of this survey is to monitor only one specific species. Therefore based on the lifecycle of the species, the goals of the project and recommendations from experts, the capture/release method was selected as the most suitable method to monitor the western small-footed myotis in the Milk River Basin (Vanhof 2003, Lausen per comm.). The following method is adapted from the Alberta bat surveying protocol (Vanhof 2003).

3.2 Study Area

The western small-footed myotis is distributed in the eastern half of the Milk River Basin. Therefore surveys for the species will be contained to suitable sites between the Saskatchewan border and highway 4 (Figure 5.4.1). Surveys have not been attempted west of Writing on Stone Provincial Park; by extending the surveys west from the park the western boundary for the species in the Milk River Basin will be established (Lausen 2003, Lausen per comm.).

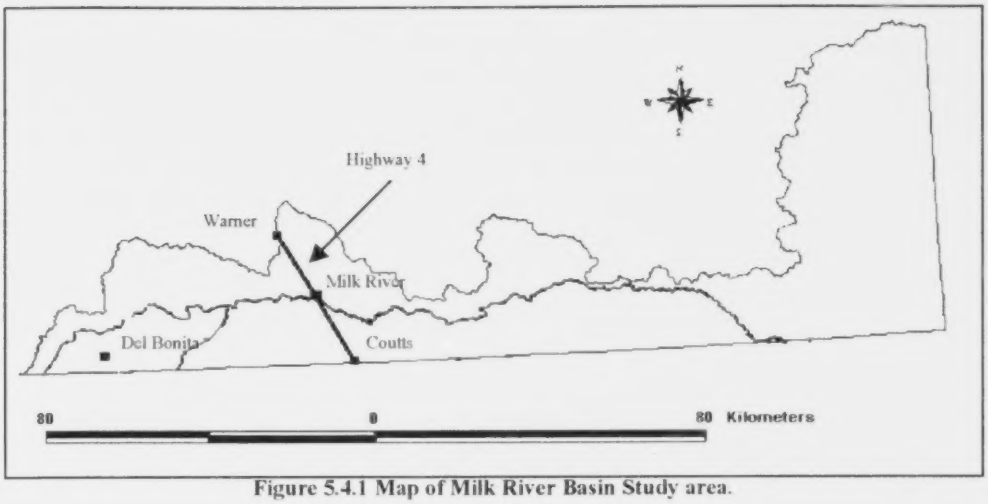


Figure 5.4.1 Map of Milk River Basin Study area.

3.4 Site Selection

The sites selected for surveying will be based on the habitat associations of the western small-footed myotis. As part of the MULTISAR: The Milk River Basin project a Habitat Suitability Index model (HSI) was developed for the western small-footed myotis which highlights areas of suitable habitat for the species (Laundry 2003). The areas highlighted by the HSI model will be selected for this study (Figure 5.4.2).

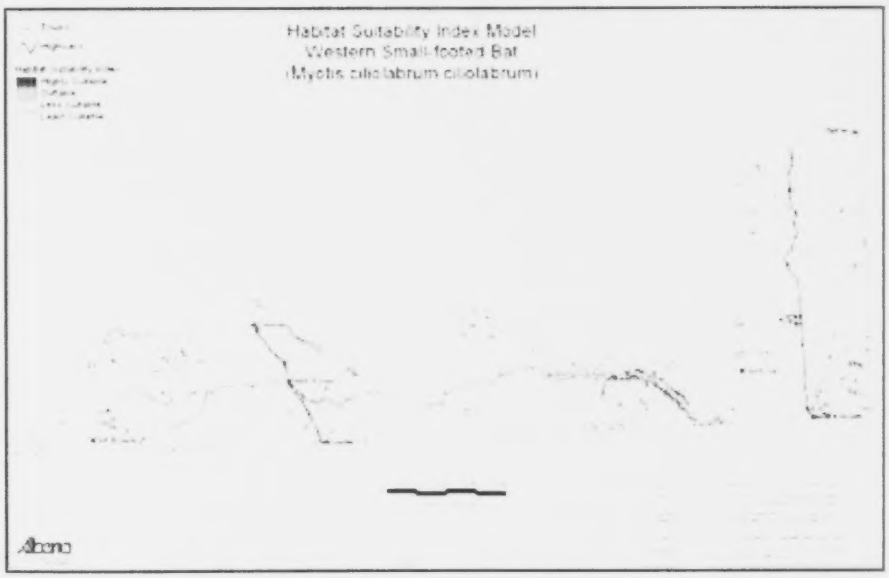


Figure 5.4.2 Western small-footed myotis habitat map based on model developed by Landry (2003) for the Milk River Basin.

3.5 Survey Timing and Conditions

The western small-footed bat is only active during the spring and summer months, therefore surveys should take place between mid-May to mid August (Lausen and Barclay 2002, Sieder man and Zabel 2001, Holloway and Barclay 2000, Van Zyll de Jong 1985 1985). Capture rates can change in an area based on weather conditions, moon phases, and age and sex classes (Lausen per comm.). Due to this, weather and moon phases should be monitored constantly through the survey period. Survey should not be attempted during rain, high winds, or during a fullmoon. In addition all sites should be resurveyed during the study to avoid sex and age biases (Vanhof 2003).

3.6 Mistnetting Setup

Mistnets that will be used will on average be 42 feet long, 10 feet high (Figure 5.4.3) (Vanhof 2003, Lausen per comm.). The nets will have a mesh size of 36mm and are constructed from 50-70-denier/2 ply nylon (Vanhof 2003). The nets will be supported by 10' length aluminum tubing, in cases where nets need to be held higher than 10' additional poles may be added using 30 cm long solid aluminum conductors (Vanhof 2003). Guy lines will be used to hold the nets in place. In areas of suitable habitat the mist nets will be placed in common foraging pathways. This may include, edges of rock cliffs, slow flowing streams, and edges of cottonwood forests (Vanhof 2003). The western small-footed myotis uses a variety of habitat types depending on environmental conditions therefore it is important to monitor all possible habitat types equally. The nets should be placed under branches or rock ledge, which will allow for vertical funneling of the species. This will force bats to fly above or below the obstacle, which increases the chance of capture. Topography and vegetative structure can also funnel bat horizontally into the nets. To take advantage of this, nets may be stacked or put into a variety of shapes. The ways the nets are set up vary depending on the topography and structure of each site.

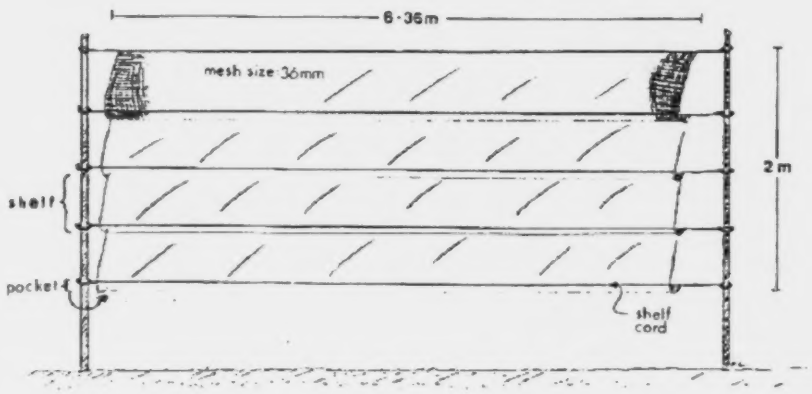


Figure 5.4.3 Mistnet components and dimensions (Vanhof 2003).

Set up of the capture stations should take place during the day prior to the survey. However the net should not be hung until sunset, this will avoid the accidental capture of songbirds. During the setup of the nets a Bat Habitat data sheet should be completed (Appendix O). Sites should be sampled for more than one night however not consecutively (Vanhof 2003). For the purpose of this study the nets will be moved to a new site each night.

3.7 Capture

Sites should be monitored from evening twilight to the sunrise the next day (Vanhof 2003). The time the net is hung and taken down will be recorded on the Bat capture data sheet (Appendix P). Each mistnet should be checked every 10-15 minutes depending on the level of activity at each net. Checking the nets often will decrease the chance of the bats eating through the net or becoming entangled. A 2 person crew can monitor 6 nets a night, however if the nets become too busy half of the nets should be taken down. During the second half of the night the nets, which have already collected data, will be taken down and the other half will be placed back up (Lausen per.comm.).

When bats are captured they should be removed from the net the same direction they came into the net (Vanhof 2003). Each observer should wear close fitting leather gloves and have updated rabies shots prior to handling the bats. Captured bats should be immediately placed in a thin cotton drawstring bag (Vanhof 2003). The drawstring should be knotted to avoid escapes. The bats should not be processed for approximately an hour to allow for the digestion of recently consumed food. Females in the late stages of pregnancy or lactating females should not be held for extended time periods (Vanhof 2003).

Species, weight, sex, age, reproductive status, and forearm measurements should be taken in accordance with the Alberta bat protocol guidelines (Vanhof 2003) and recorded on the Bat Capture Data sheet.

- The western small-footed bat is not commonly mistaken for any other bat in the province however caution should still be taken during the identification process. If it is not possible to rank an individual by species the observer should rank under family or genus name.
- Bats will be weighed in the cotton bags using a Psola.
- The Forearm will be measured from the base of the thumb to the ulna (Appendix Q). The observer will measure the forearm three times and take the average of these measurements.
- The bats are sexed based on the external genitalia of the males.
- Pregnant females can be identified by gentle palpations to the abdomen, and lactating females can be identified by their enlarged nipples which when pinched release milk.
- Juveniles and adult bats can be distinguished by the finger joints. Juvenile bats possess cartiliage between the plates of the finger bones, this make the joints appear smoother than that of adults (Appendix Q).

Bats are released immediately after processing by letting them fly off the observers hand or placing them on the side of a tree to fly off on their own (Vanhof 2003). Bats should be observed after release for as long as possible to avoid distress and capture myophathy.

3.8 Data Analysis

The survey effort will be measured by the number of western small-footed bats captured per night and per hour (Vnahof 2003). This will be done for each age and sex class for the western small-footed bat. Though the western small-footed bat is the key species in this study all bats captured will be processed and similar analysis will be preformed for these species if there is enough data. All capture information collected will be entered into the Alberta Biodiversity/Species Observation Database (BSOD).

Equipment Required

- Research permit from Natural Resource Service
- Hands free Headlamp
- Data Sheets, Clipboard and Pencil
- GPS unit
- Mistnet
- 10' aluminum poles
- 30 cm long aluminum conductors
- Guy lines
- Leather gloves (Close fitting)
- Small scissors (2 pairs)
- Cloth drawstring bag (36)
- Psola
- Dial capilars (measuring forearm)
- Small ruler
- Identification Key
- Camera with flash

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7.0 PERSONAL COMMUNICATION

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Appendix O- Bat Habitat Sheet

Location: Easting Northing
Legal land discription: Quater Section Twp Rge
Observer

800m x 800m

Circle the percent composition of each habitat class within 400 m mist net. If not present leave blank.	Cultivation Dryland	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Cultivation Irrigation	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Tame Pasture	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Native Graminoid	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
Topography (circle) Rolling Hills Flat Plains Coulee or Valley Other Slope:_____ Slumping Yes No	Shrubs	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Riparian	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Wetland	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Lake	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Treed	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%
	Other	1-10%	11-20%	21-30%	31-40%	41-50%
		51-60%	61-70%	71-80%	81-90%	91-100%

Additional Features – indicate yes or no and circle closest distance to nest

Barbed Wire Fence	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Roads (Gravel, Paved, or Trail)	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Power Lines	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Buildings (Active or Abandoned)	Y N	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400
Other:	Distance from nest (m): 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-400	

Drawing of Study area

General Comments:

Appendix P- Bat Capture Data Sheet

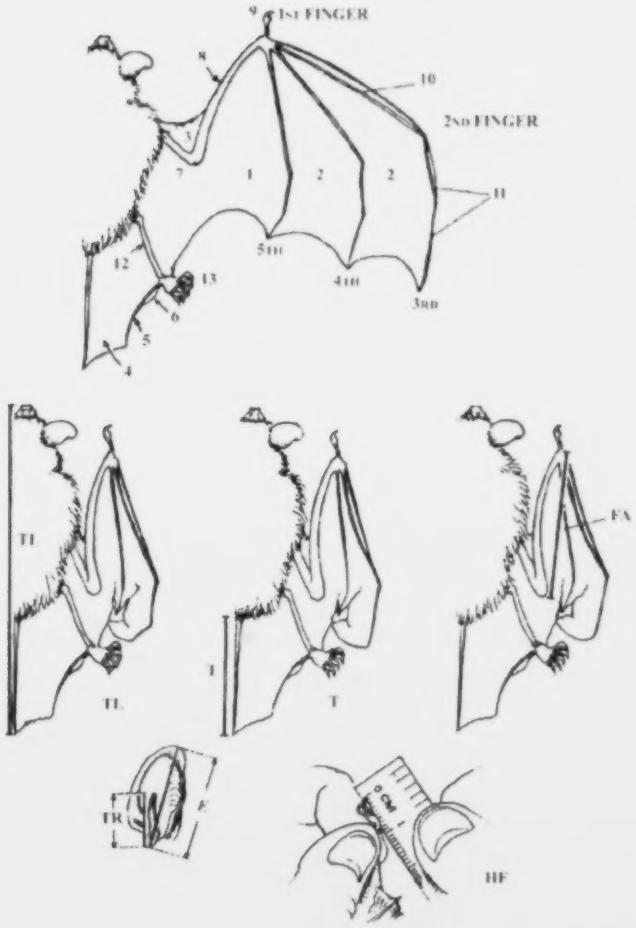
Site :_____
Observers:_____
Date:_____
Start Time:_____End Time:_____
Moon Phase:_____

Weather Information: **Start** Calm Light breeze Mod. Breeze Windy Sunny Partially Overcast Overcast Temperature: ___°C Light rain Light Snow Other:	**End** Calm light breeze Mod. Breeze Windy Sunny Partially Overcast Overcast Temperature: ___°C Light rain Light Snow Other:_____
Easting: Nothing:	

Species	Weight (g)	Forearm (mm)	Sex (M- male, F- female)	Age (A- adult, J- juvenile)	Reproductive Status*	Comments

* Reproductive codes: MM-mature male, PF- pregnant female, LF- Lactating female, MF-mature female, J-juvenile

Appendix Q- Bat Physiology



Parts of the Bat

1	Plagiopatagium
2	Chiropatagium
3	Propatagium
4	Uropatagium
5	Calcar
6	Keel of the Calcar
7	Upper Arm
8	Forarm
9	Thumb
10	Metacarpals
11	Phalanges
12	Tibia
13	Foot

Measurements

TL	Total length
T	Length of tail
FA	Length of forearm
E	Length of ear
tr	Tragus
HF	Length of foot

(van Zyll de Jong 1985 1985, as cited by Vanhof 2003)

A: Finger Joint of Juvenile
visible when illuminated
B: Finger Joint of Adult

(Nagorsen and Brigham 1993 as cited by Vanhof 2003)

Bat- ephiphyseal plates
by light.
Bat- Knobby joints

CHAPTER 6

MULTISAR STEWARDSHIP PROGRAM

2.0 MODEL APPROACH

The multi-species conservation value (MCV) was calculated mathematically by using the weighted average of all selected species in each quarter section within the Milk River Basin.

$$\mathbf{MCV} = (\mathbf{avg} \sum_{i=16}^{n} (\mathbf{HSIij} * \mathbf{SSi} * \mathbf{SDi} * \mathbf{HPSi})) + \mathbf{FR\ value}$$

where:

n	= the number of species
HSI_{ij}	= the habitat suitability index value for species i at location j
SS_i	= the species status weighting values for species i
SD_i	= the species distribution weighting value for species i
HPS_i	= the habitat patch size weighting values for species i
FR	= added value for the presence of a fish refugia

2.1 Weighted Average

Values were based on a weighted HSI value for each species (Akcakaya 2000). Weighting is based on:

1. Species level of endangerment. As the federal and Alberta listing may differ, we used the higher rating of the two (Table 6.1.2).

2. Species distribution within the basin. Species with restricted distributions contribute more to the value than those with a wide distribution (Table 6.1.3).

3. Species habitat patch size. Species that are restricted to specific small patches of habitat contribute more to the conservation value that wide ranging species (Table 6.1.3).

This was done for 16 of the 17 management species. The olive-backed pocket mouse was excluded due to the difficulties in applying the model to the landscape (Gummer and Kissner 2004).

Table 6.1.2. Species and status for which Habitat Suitability Index models and habitat suitability maps were produced as part of the Milk River Drainage Species at Risk Conservation Strategy.

Species	Alberta General Status	Alberta Legal Designation	Federal Legal Designation	Overall HSI Status
Sharp-tailed Grouse	Sensitive	Not Assessed	Not at Risk	Sensitive
Ferruginous Hawk	At Risk	Threatened	Special Concern	May be at Risk
Burrowing Owl	At Risk	Threatened	Endangered	At Risk
Prairie Rattlesnake	May be at Risk	Data Deficient	Not at Risk	Sensitive
Great Plains Toad	May be at Risk	Data Deficient	Special Concern	May be at risk
Loggerhead Shrike	Sensitive	Threatened	Threatened	May be at Risk
Prairie Falcon	Sensitive	Special Concern	Not at Risk	Sensitive
American Badger	Sensitive	Data Deficient	Not at Risk	Sensitive
Richardson Ground Squirrel	Not at Risk	Not Assessed	Not at Risk	Not at Risk
Short Horned Lizard	May be at Risk	Not Assessed	Threatened	May be at Risk
Plains Spadefoot	May be at Risk	Not Assessed	Not at Risk	May be at Risk
Western Small-Footed Bat	Sensitive	Not Assessed	Not ranked	Sensitive
Sprague's Pipit	Sensitive	Special Concern	Threatened	May be at Risk
Weidemeyer's Admiral	May be at Risk	Not Assessed	Sensitive	May be at Risk
Swift Fox	At Risk	Endangered	Endangered	At Risk
Long-billed Curlew	May be at Risk	Special Concern	Sensitive	Sensitive

Table 6.1.3. Species Distribution and Patch Size ratings for the 17 species for which Habitat suitability index models were developed as a component of MULTISAR.

Species	Species Distribution	Species Habitat Patch Size
Sharp-tailed Grouse	Wide spread	Wide spread
Ferruginous Hawk	Wide spread	Wide spread
Burrowing Owl	Wide spread	Wide spread
Prairie Rattlesnake	Restricted	Localized
Great Plains Toad	Restricted	Localized
Loggerhead Shrike	Wide spread	Localized
Prairie Falcon	Wide spread	Localized
American Badger	Wide spread	Wide spread
Richardson Ground Squirrel	Wide spread	Wide spread
Short Horned Lizard	Restricted	Localized
Plains Spadefoot	Wide spread*	Localized
Western Small-Footed Bat	Restricted	Localized
Sprague's Pipit	Wide spread	Wide spread
Weidemeyer's Admiral	Restricted	Localized
Swift Fox	Wide spread	Wide spread
Long-billed Curlew	Wide spread	Wide spread

* considered wide spread in Milk River Basin, may be restricted outside the basin.

2.2 Fish Refugia

A bonus point was added to the average for the presence of fish refugia. Fish refugia are pools that are present during times of drought were most of the creek / stream has dried up. They are holding pools for brassy minnow to recolonize the stream when water levels return to normal. The bonus value was to ensure those quarter sections were a refugia was present factored into the prioritization formula. The weighting values for each factor are provided in Table 6.1.4.

Table 6.1.4 Weighting values used in calculating the multi-species conservation values within the MULTISAR project area.

Weighting Category	Description	Value
Species Status*	Endangered	4
	Threatened	3
	Special Concern	2
	Not at Risk	1
	Data Deficient	1
Species Distribution	Restricted	2
	Wide Spread	1
Habitat Patch Size	Localized in small habitat patches	2
	Wide Spread	1

* species status based on the ranking given by COSEWIC

3.0 LANDSCAPE PRIORITIZATION

The multi-species conservation value formula was applied to the MULTISAR project area. Calculated MCV values ranged from 0 to 6.00. Values were divided into 4 categories for prioritizing stewardship activities (Table 6.1.5). Figure 6.1.1 depicts the areas of high importance for stewardship activities. Approximately 4 % of the project area is high priority for stewardship activities (Table 6.1.6)

Table 6.1.5 Multi-species prioritization ranking for MULTISAR Project area.

Multi-species Conservation Score Range	Stewardship Priority
4.00 - 6.00	High
2.00 - 2.99	Moderate
1.00 – 1.99	Low
0.00 – 0.99	No Value

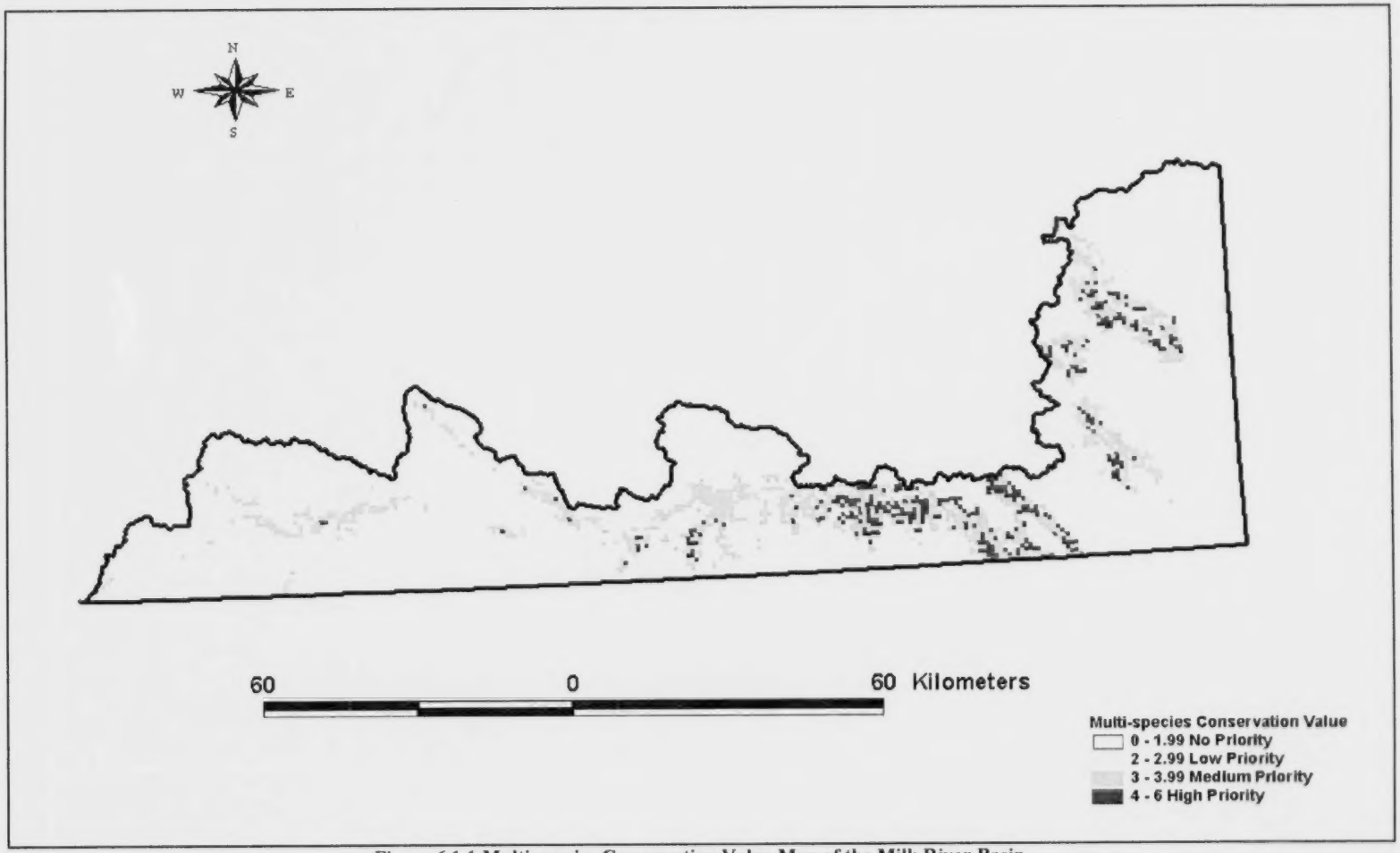


Figure 6.1.1 Multi-species Conservation Value Map of the Milk River Basin.

Table 6.1.6 Percentage of MULTISAR area within the 4 classes of priority for stewardship activities

Category	MCV Value Range	# Quarter Sections	Percent of basin
No Priority	0.00 -1.99	5487	52%
Low Priority	2.00 - 2.99	3582	34%
Medium Priority	3.00 - 3.99	1140	11%
High Priority	4.00 - 6.00	382	4%

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MULTISAR Stewardship Program

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1.0 INTRODUCTION

MULTISAR: The Milk River Basin Project conserves species at risk at the landscape level. This is accomplished through multi-partner stewardship initiatives in key areas of the landscape. These stewardship programs involve private landowners, Alberta Conservation Association, Alberta Fish and Wildlife Division, Alberta Public Lands Division and other conservation groups with an interest on the landscape. The program operates on a voluntary basis with key landowners in the Milk River Basin. Each ranch is assessed and dealt with in a site-specific manner according to the wildlife that exists on that particular ranch.

2.0 INITIATION OF THE MULTISAR STEWARDSHIP PROGRAM

Priority areas for species at risk conservation were identified using Habitat Suitability Index (HSI) models to calculate Multi-species Conservation Values (Jones and Downey 2004). Landowners in these key areas are being invited by MULTISAR staff to take part in the MULTISAR stewardship program. If the landowners are interested then stewardship programs are initiated on their land as funds become available. This program follows several steps.

2.1 Stewardship Steps

1. Talk to landowners about the program. Proceed with the stewardship process for those landowners who agree to participate.
2. First meeting between landowner, habitat/range specialist, Alberta Fish and Wildlife Division (AFWD), Alberta Conservation Association (ACA) and Alberta Public Lands Division (APL)(if public lands are leased by ranch). This initial meeting allows the habitat specialist to learn the history of the ranch, grazing systems used, and wildlife species known to occur on the land. A ranch tour is arranged, often concurrent with the first meeting. At this time the rancher is also encouraged to suggest any improvements they may be interested in.
3. Wildlife habitat assessments are conducted in the summer to determine habitat conditions.
4. During the wildlife habitat assessments, wildlife monitoring surveys will be conducted by MULTISAR staff.
5. The habitat specialist assesses overall health of habitat/range on the ranch and identifies possible improvements that can be made.
6. A second meeting is carried out between the landowner, habitat specialist, AFWD, Public Lands, and ACA after the completion of the habitat/range assessment. The habitat specialist reviews habitat condition and MULTISAR staff

review inventory results and desired wildlife population and goals/ habitat conditions; recommendations are then made and discussed. Wildlife species Beneficial Management Plans (Rangeland Conservation Services (RCS) 2004) are incorporated into the ranch strategy depending on the species occurring or having the potential to occur on the land. Habitat Management Strategies are developed which benefit both wildlife and cattle operations.

7. The habitat specialist writes a draft stewardship plan in consultation with the landowner, ACA, AFWD and Public Lands Division (where public lands are present on ranch).
8. The habitat specialist then further revises the plan and produces a final report for the landowner, AFWD and ACA.

2.2 Improvements and Conservation Action Steps

1. The habitat specialist and MULTISAR staff prioritize a list of improvements and conservation actions in the Conservation Strategy after discussion with the landowner, ACA, AFWD and APL.
2. Negotiations may occur between the Landowner, ACA, APL and AFWD on the implementation of specific conservation recommendations.
3. Implementation of the recommendations may be worked on over several years depending on budgets.
4. ACA may fund varying proportions of conservation actions/improvements depending on negotiations with landowners, priorities and funding availability. Examples of conservation actions/improvements include: protection of riparian areas, re-establishment of rangeland, changes to fencing, water developments, gates, and other measures.
5. Wildlife population and habitat monitoring may occur at intervals specified in individual ranch habitat strategies. The monitoring protocol will be developed on a ranch-by-ranch basis.

A MULTISAR Conservation Agreement is signed between the cooperating landowner, Alberta Conservation Association, and Alberta Fish and Wildlife Division. This Conservation Agreement will be compliant with the federal Species at Risk Act (SARA) and Alberta's Wildlife Act in order to provide adequate protection to species at risk. The Conservation Agreement will also be designed to formally recognize that the landowner is managing species at risk in an appropriate manner.

3.0 SUMMARY OF 2003-2004 STEWARDSHIP ACTIVITIES

In 2003, 16 Habitat Suitability Index (HSI) models were completed for MULTISAR: The Milk River Basin (Downey et al. 2004). These were used to determine the Multi-species Conservation Values (MCV) of each quarter section in the (Milk River Basin) (Jones and Downey 2004). This prioritized the landscape for conservation and stewardship of species at risk. The MCV is a primary consideration in determining locations for stewardship activities in the Milk River Basin.

The Beneficial Management Plans (BMPs) were completed in 2004 (RCS 2004). The BMPs provide guidance for developing specific stewardship actions on a ranch-by-ranch basis.

A MULTISAR stewardship brochure was developed in 2003, which provides an overview of the stewardship process. It was distributed to landowners throughout the basin, and to conservation and agricultural professionals who work in the Milk River area (Table 6.2.1). In addition, the MULTISAR brochures were distributed at an Operation Grassland Community town hall meeting on species at risk and the new federal legislation. Operation Grassland Community has distributed the MULTISAR brochures to their co-operating landowners in the project area.

Table 6.2.1. Distribution of MULTISAR brochures in the Milk River Basin.

Recipient	# Of Brochures
Private Landowners	85
Agriculture Fieldsman (County offices)	50
Community offices with the Basin	20
Alberta Fish and Wildlife Division	20
Alberta Conservation Association	10
Canadian Wildlife Service	20
Alberta Provincial Parks	40
Alberta Public Lands	10
Operation Grassland Community	10
Calgary Zoo Endangered Species Team	15
Prairie Conservation and Endangered Species Conference	43
Total distributed	303

In 2004 the first private landowner agreed to participate in the MULTISAR stewardship program. Much of the land on this ranch is ranked as High priority for conservation actions using the Multi-species Conservation Values (MCV). This large project (2.5 Townships) is currently underway with wildlife habitat assessments and wildlife inventories to occur in the spring and summer of 2004.

GOALS FOR 2004-2005

- Complete first 9 steps in a cooperative MULTISAR Stewardship program on 2.5 Townships of high MCV land in the Milk River Basin.
- Initiate the improvement and conservation phase of the stewardship program in 2005.
- Establish a wildlife monitoring program for species at risk on MULTISAR cooperators lands.
- Continue baseline inventory and wildlife monitoring throughout the Milk River Basin.
- Continue educating the public on the MULTISAR project through distribution of brochures and landowner visits.

- Obtain participation of several additional landowners for 2005 MULTISAR stewardship projects in high MCV areas of the Milk River Basin.
- Continue to assess the effectiveness of the MULTISAR stewardship program.

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